# SUC-SESSION

## YOUR MAGAZIN FOR THE SINCLAIR SPECTRUM

- News
- The ZX-VGA-Joy Video-Interface
- Repair of the Lower RAM on Spectrum 48
- »Artificial Intelligenze« and the ZX Spectrum
- Adventure-Solution »Live Term«
- Spectrum User Meeting in Sonnenbühl and Wittenberg
- Story »The splitting of the bit« - Teil 1
- And much more ...

ISSUE
**224.**
OF YOUR
MAGAZINE

**FOR SUBSCRIBERS WITH SCENE+ DISK AND TAP**

THE NEWEST AND BEST PROGRAMS
DIRECTLY DELIVERED TO YOU

# INTRODUCTION

Dear *SUC Session* readers,

we are proud to present our new issue.

In the magazine you can find an article that had me worrying for a long time. It deals with artificial intelligence. The article is inspired by a book I bought together with a ZX Spectrum. The article describes my view of things - of course. You have to judge whether I succeeded or not. I also dared to write a story. Part 1 of the story can be found in the back of the magazine.

Currently we have the following problem in the editorial office, more precisely Thomas has a problem. Here we need your help.

Many new games and demos are being written for the ZX Spectrum. A few years ago, there were only a few, but in the meantime there are so many that Thomas can't keep up any longer to look at, judge and describe them all.

My/our question is: Which reader of the SUC session can support Thomas in viewing and describing the new games and demos? This help is really necessary!

In every booklet I have made you can find basic gimmicks. The basic gimmicks come from different sources. But now I run out of gimmicks as well as sources. If you find short programs in your stock, I would be happy about it.

I would like to note that only three people worked on this issue...

Spectrumania has repercussions on the SUC session. Just at the moment the group photo was taken, a UFO crossed the school, and everyone was pointing at it. This UFO crept in here. Despite fierce opposition, the editors could not prevent this magazine from being infiltrated.

Whoever finds all the UFOs gets a kaputt refrigerator from Thomas! Pickup only!

Many greetings, Joachim

December 10th, 2019.

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# IMPRINT


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We thank all helpers for their contributions!

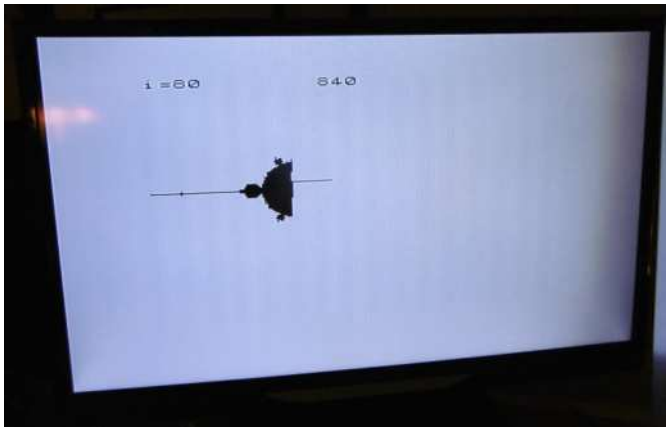
# READERS LETTERS

Hello, folks,

Unfortunately there were once again far too few letters to the editor. Some e-mails came from readers who thanked us for the last issue. Thank you very much, your praise is always welcome. We answer the few longer letters to the editor here:

**Lothar Ebelshäuser from the Eifel mountains writes to us reliably:**

*Hello Thomas,*
*please excuse me for not answering until today. A slight relapse had invited me back to the hospital. But now I feel better again. The SUC session no. 222 has arrived with me in the meantime. Of course, it's a pity for me if it doesn't work with the disks. But it is understandable from the post office. Who still sends disks today?*
*With the old information I want you to tell me which one you are looking for. I still have a lot of old magazines at home. Wolfgang Haller had everything complete. But after his death everything was thrown away. I'll look then, and can tell you whether I own the respective issues.*
*In the appendix you will find three photos concerning the*
*Basic gimmick at the end of the staple. (Apple manikin). After seven hours I gave up. But I would be interested to know after what time a 128 Specci did that.*
*That would be it for today.*
*Many greetings from the Eifel, Lothar*




**Hello, Lothar,**
**since there were always problems with the diskette with you, I wrapped your diskette in aluminum foil last time and that worked. Your floppy arrived and is still being loaded. Other users haven't reported such problems, maybe the Eifel is working with strong magnetic fields in the post office.**
**Personally, I also have a large collection of SPC magazines, but in issue 222 I mentioned the magazines of the Wuppertal SUC. Here Joachim can send you a list of what is missing, because thanks to Roelof we scanned all issues and uploaded them to WOS (they haven't published it for a year, but at least it's safe on their server).**
**Maybe Joachim can say something about the Apfelmännchen.**

***Hello Lothar,***
***I noticed in the article that the Mandelbrot graphic runs for a very long time. I run the graphic for more than 16 hours.***
***Two years ago, I compared some of the home computers. Our ZX Spectrum was one of the slower ones. Whereby the ZX Spectrum +3 was slower than the ZX 48.***
***The program I use for this calculates prime numbers in the range from 1 to 1000, measuring only the time of the calculation and ignoring the complete output to the screen. The program and the results of the tests can be found as an article in the back of this issue. From this you can see the speed of some computers.***
***Greetings, Joachim***

**Ingo from Potsdam has recovered a bit and is now active again:**

*Hello Thomas,*
*if you ever get a ZX Spectrum +3 in cosmetically perfect and functional condition in an original box with all accessories and you can offer it to me at a "halfway decent" price, I would be happy about a message.*
*You won't be in Mahlerts (according to the current list of participants)?*
*By the way: I haven't made anything since October 2018, or haven't even been to my hobby cellar since then.*
*I am still in the recovery phase after my heart valve operation (new, mechanical aortic valve), which I had to undergo in mid-November last year. I signed up for Mahlerts with Sandra and hope or assume that I will feel fit enough for the ride until then - this time only with minimal and above all*

*light technique (will probably stay with a ZX Uno + TFT glider).*
*Many greetings, Ingo.*

**Hello Ingo,**
**for the Spectrum +3 I can't give you much hope, I'm still selling some accessories that Ben and others make, but buying and restoring Spectrum's is no longer my thing. Most Spectrum's have bugs that you can't spot right away and that I can't fix as a non-technician. When I was doing this, it took me hours to change foils or repair built-in drive/recorders. I don't have the time anymore and most of the time it wouldn't be enough. But I printed your letter to the editor, a reader might have an offer for you.**
**From your OP you had reported to me yes. Finally it may be a laborious way, but it goes upward and that is the main thing. The cellar can still wait. It didn't work out with Mahlerts, maybe next year.**

**Our diligent reader Harald from Raubling has contacted us:**

*Hello Thomas,*
*first, big praise for the new club info. Even though I appeared disproportionately this time, I found the rest of the articles very refreshing and entertaining. Unfortunately, two horrors hit me during the reading, which I cannot and do not want to leave standing like this. First of all, I grabbed my own nose: I noticed that my adventure article "WizBiz" does not have a printed plan. Did I forget to send it along? Unfortunately, I don't have the mail anymore, so I can't understand the fact. I hope it didn't fall victim to your "editorial activities". In case of doubt I send it again :-) Short info is enough, gell Thomas*
*The far more severe shock concerned the current participation in the design of the club newspaper. Could it be that only FOUR people design the complete magazine? Let's blame the weather on the fact that the users have become so lazy. We are used to just consuming, but somebody has to produce the content after all! And who, if not us (a sworn community of Spectrum crazy people) - have something to report to the world. So, I mean, each of us can report something about his hobby - highly scientific papers are not required. So people, get to the keyboards and write to a fare-thee-well. Here in the club there is still freedom of opinion and what to discuss or share should always be there. In this sense, until the next "thick" info. In case you're lacking ideas, take up Joachim's suggestion and introduce yourself and your hobby briefly.*
*Harald*
*PS: I think the deadline is a good idea. I'll try to finish an adventure solution by then (but can't guarantee anything - adventures are sometimes stubborn opponents).*

***Hello, Harald,***
***yes, the support leaves much to be desired. If you also consider that Joachim also has the layout as a task, it seems to be badly distributed. To be honest, we have to admit that we get some input e.g. at "News in a nutshell" from the internet and that we owe it to the diligent users who publish these things on the internet. Despite that, more participation please... more users are in demand.***
***Joachim will comment on the missing map of WizBiz.***
***Ashes on my head! I really forgot the map of WizBiz. But it can be found in this issue.***
***The fact that you, dear Harald, were over proportionally represented in the last issue was due to the fact that there were no articles available, apart from those whose authors can also be found in the imprint. I have almost reached for the straw called "Harald". Many thanks for your diligence!***
***Greetings, Joachim***

**One more question from Lothar:**

*Hello Thomas,*
*something different today. I recently got several old PCs for free. Now I'm starting to connect and test one after the other. The first one had a problem with the PS2 socket of the keyboard. The second one works fine so far, but with Windows ME. I never had this operating system before. Can you give me a source where I could get a manual about Windows ME?*
*Many thanks first and many greetings from the Eifel, Lothar*

***Hello Lothar, Windows ME is not my area of expertise at all, but I have printed the reader's letter, maybe another reader can help.***
***Me again: You can find it on the internet at this address:***

***https://docplayer.org/11345814-Bedienungsanleitung-fuer-windows-98-und-me.html***
***a complete manual about Windows 98 and Windows ME. Further there is at knowware.de under operating systems for 2€ a booklet to the entrance into Windows ME.***
***Greetings, Joachim***

**Another message from Ingo:**

*Hello Thomas,*
*many thanks for sending me issue 223, which I now have in electronic and printed form. I am always very much looking forward to it. I like the idea of introducing members of the SUC one after the other and I will start to create my portrait for one of the next issues.*
*Many greetings, Ingo*

*Hello Ingo...*

**we are waiting for your performance. Who are you?**

**An e-mail also reached us from Norbert Opitz:**

*Hello Thomas !*
*I would like to thank you very much for the SUC session. Under "News in brief - Sinclair's visions" you can see a Speccy by Ingo Truppel at the VCFB 2018.*
*With him I participate every year since 2013 as an exhibitor at this event, so it is also planned this year.*
*The website is www.vcfb.de . Another interesting site is www.schreibfabrik.de by René Meyer, who is involved in the organization of the "Long Night of Computer Games in Leipzig", "Retogaming" at the Gamescom in Cologne and also the VCFB in Berlin.*
*Bye, Norbert*

Norbert and Ingo at the Gamescom in Cologne

**Hello, Norbert,**
**thank you for your information. I think it's very good that you also hold up the Spectrum flag at Gamescom. Great thing.**

Letters to the editor as always to Thomas by email:
thomas.eberle@sintech-shop.de

# NEWS IN SHORT...

**All about the Spectrum-Next**
I'm not quite sure who made this website, but you can hardly better summarize everything there is to say about Spectrum-Next. Starting with the creation, the first presentation and the Kickstarter project, up to the latest games and applications, everything is summarized here. If you don't already know everything about it anyway, you'll be enlightened here:
*www.spectrumnextgames.uk*

**Return of the keypad**
Retro Radionics asks for interested parties for a new edition of the 128k Keypads. The keypad was delivered in Spain with the Spectrum 128. There was also an English version, but it is very rare. Despite the fact that there is actually no meaningful use, the demand seems to be large, so that Retro-Radionics will probably produce this numeric keypad.
*https://retroradionics.co.uk/*

**Largest Spectrum Exhibition in the World in Portugal**
In Portugal the »***LOAD*** *""-exhibition*« was opened and boasts to be the biggest Spectrum-exhibition. Over 100 Spectrum and Timex Sinclair machines will be on display, as well as other machines designed by ex-Sinclair employees. If someone were to spend their holidays in Portugal and visit this museum, it would be nice to hear about it. Meanwhile I can only offer this video:
*https://www.youtube.com/watch?v=Ofyhz5sqbfM&fbcli=*

**New BS-DOS**

As can be learned from well-informed circles, Busysoft is working on a new operating system for the MB02+. Background is also the release of the MB03, which already exists as a prototype. You can expect a lot from the new operating system, but maybe patience is also necessary. The last BS-DOS was released in 1995...

**Spectrum-Next in production**

According to the latest update of the "Spectrum-Next" makers, the problems with the case and the keyboard have been solved. A pilot production of 50 keyboards is currently underway to ensure that no difficulties arise during production. After this test phase the other 3000 will be produced. The same goes for the case. That means that first 50 pieces are manufactured and then after release the rest. Even though we are talking about six weeks here, we assume that the "Spectrum-Next" will at most be an early Christmas present. Unfortunately, the delivery will probably take place after a Brexit from Great Britain and this will most likely be unregulated. This means that for all users outside Great Britain the NEXT will be 19 or 20% more expensive, depending on the VAT rate in the recipient country. But I don't think that will stop anyone.

**No rain**

Demo fans know the problem. The Spectrum has a lower memory area (contended memory) that runs a bit slower than the upper area. You should keep this in mind when programming, usually you just store graphics in this area and no program code. Russian clones don't have the problem and therefore the Russians don't care much. Their programs are structured differently and this shows up in a flickering of some demos, what is called "rain". For a long time there has been a conversion among experts that avoids this flickering, now Byte Delight offers this solution officially in the shop:

*https://www.bytedelight.com/?product=unrainer-modification-fix-for-zx-spectrum-128k-toastrack-2-grey-model*

**As the uncle so the nephew**

Electromobility is probably in demand in the Sinclair family. Sir Clive's nephew Grant also wants to bring an electric car onto the market that is remotely reminiscent of the C5. With just over 4000 pounds, you're on board, and could even be more expensive...

*https://www.grantsinclair.com/en/e-bike.html*

**How to program a SAM**

An introductory course in assembler, specially tailored to the SAM COUPE... This is more than rare, the meanwhile few SAM friends will be happy, but also worth reading for all others:
https://www.pjgcreations.co.uk/sam-coupe-assembly-language-programming/

**MB03+ ready**

A small production of the MB03+ interface has already been made for all those who ordered in advance. Now BYTE DELIGHT will take over the production and offer the interface shortly.

**New MB02+ Software**

On Hood's website you can find new versions of ESX-DOS for the MB02, an MP3 player for Neo-GS soundcard and more, all for the MB02. It's always worthwhile for MB02+ users to have a look:
https://hood.speccy.cz/dwnld.htm

# 2nd ZX Spectrum User Meeting in Sonnenbühl

**by Thomas Eberle**

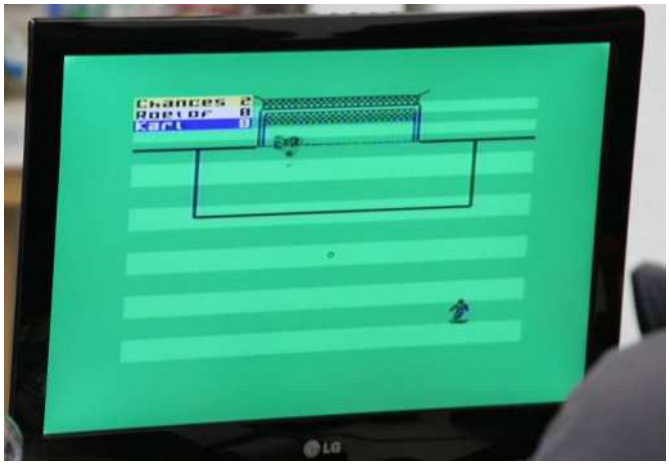
Already for the second time Joachim organized this event and so on the morning of the 04th of May I made my way to the Swabian Alb, which took about one and a half hours. I had all my ZX Spectrum equipment with me, which finally prooved to be useful. There have already been users who drove through Sonnenbühl-Willmandingen without finding the hall of the christian community (Gemeindehaus). This didn't happen to me, it was very easy to find and well signposted, but above all well described by Joachim. To my astonishment there were only five users in the room when I entered it. This had shocked me at first a little bit, in comparison to the previous year some users were missing nevertheless with which I had counted surely. So I first built up my Spectrum. My girlfriend Daniela partly saw the equipment for the first time, but didn't get any round eyes yet. There were signs of an uneventful day when suddenly the door opened and Bernhard Lutz (Luzie) and his girlfriend Andrea stormed the room. Hardly built up, he started, following his previous call in the forum, the Tetris competition. I lost immediately against Andrea,

*Tetris Competition*

Roland held himself longer. In the end Andrea got the crown, she had been practicing for weeks. The beginning was made, the next competition started: at "STRIKER" you had to sink free kicks into the net. Here I made a better figure, but it was the first moment when I was almost thankful that there weren't more visitors. Since everyone took part, the result was a megaduell that lasted longer. In between there were other games started, on Dieters Spectrum there was a kind of "Breakout" for two players, for which Daniela was so enthusiastic that I had to ask Dieter what the game was called. I had promised an annual duel with Roland in "Emlyn Hughes International Soccer", in which I unfortunately lost by a narrow margin. But between all this there was also one thing to see and to try out. I had introduced the new ZX-VGA interface and thanks to the port extension by Joachim I could try it together with the MB02. It worked perfectly and after 35 years I could see the really perfect Spectrum image on my private setup for the first time. My tears almost came. Already in trial mode I wanted to try out my Kempston mouse interface in combination with MB02. This was not possible in the first try, the mouse was not recognized. But the MB02 worked nevertheless, so that possibly a software solution helps. This is still my turn.

*Rudy Biesma and Roelof Koning*

Roelof Koning and Rudy Biesma had arrived from the Netherlands and Roelof amazed me with his project of his own operating system on his 48k Spectrum with CF card. IDE interface and software are designed by Roelof himself and I will probably get a detailed article about it. Rudy was busy losing all game challenges and still has to practice. He also programmed something, I suppose some cheat modes. Because the meeting took place on a smaller scale, I was able to talk to all participants in detail, we had a lot of fun and Daniela was infected with the Spectrum fever. There was hardly enough time to discuss and test everything. I missed Schombi the most, because he always brings his own car boot sale with him. So I could only buy things from myself.




**Striker Competition**

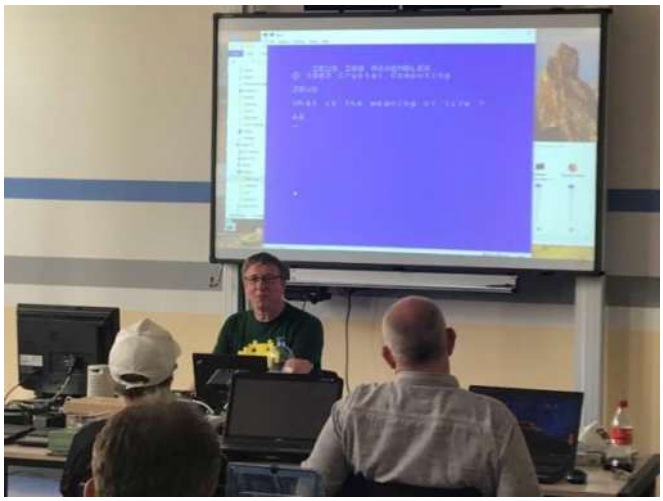
Joachim had taken care for sandwiches and drinks, but after an eventful
day everyone was hungry
and so it happened that for the first time in the history of the Spectrum meeting nobody had to be dragged by force from his Spectrum and dragged to eat. Hungry we met at the nearby Landhotel and ended the evening in a convivial atmosphere.
The conclusion of the day: A Spectrum user meeting is always worthwhile, no matter if you discuss many topics with a lot of people or if you just talk more intensively with a few people. I discovered new things and tried them out and everyone had a lot of fun, including the ladies who travelled with their friends and the visitors from close by who just took a look. But another insight is that such a meeting needs a supporting program, so every participant should consider for the next time what he could present or report. Luzie will surely have a game suggestion again.
The next pure Spectrum meeting is as far as I know in Wittenberg from 30 August to 01 September 2019. Be ready.
Te
(The article about the Spectrumania in Wittenberg can be found here next. JG)

Top from the left: Dieter Hucke, Joachim Geupel, Roland Albert, Rudy Biesma, Roelof Koning
Bottom left: Thomas Eberle, girlfriend Daniela, Monty, Bernhard Lutz, before girlfriend Andrea

# SPECTRUMANIA 2019 IN WITTENBERG

## BY THOMAS EBERLE

As every year at about the same time at the end of August, the Spectrumania takes place in the Luther town of Wittenberg. The *SpectrumTreffen* once took place in the rooms of the *Kulturclub Wittenberg*, but now Norbert Opitz organizes it on his own and he does this excellently. I never travel the 550 km by myself, Fred came to me from Stuttgart and we started our journey on Friday, only to arrive early on Saturday morning. It was an usual habit to meet for dinner on Friday evening in Wittenberg, but Fred and I arrived so late that the meal was already over. But meanwhile it is also a habit for me to still enjoy the nightlife of Wittenberg, so that also our Friday evening was still entertaining. We still had enough sleep and that was necessary, because a full program was waiting for us. For the first time in the history of the German



The Zeus assembler answers the question "What is the meaning of life?" with "42".

Spectrum meetings there was a real program. After everyone had unpacked and set up the com-

puters, we started. My first talk was the presentation of the new VGA interface together with the new bus duplication »ZXEXT«. Thanks to the excellent equipment of the Volkshochschule Wittenberg, we were able to use the latest beamer technology for the lectures. For the next lecture about an arithmetic processor with ROM switching, a simpler beamer was used due to the lack of VGA output at the demonstration spectrum. That was also possible. We continued with a lecture about memory optimized programming, jokes (Easter Eggs) hidden by programmers in Spectrum programs and the demonstration of the »Bad Apple« 2" demo.

Lecture by Dieter Hucke "Easter Eggs

Group photo, immediately after the discovery of a UFO

Ingo introduced the Harlequin 128 and Ferdinand took the audience to the retro museums of Romania and Hungary. As another special event there was also a competition on the beamer with a game named "Stock Cars 3D II", a car race for up to four players. For this a ZX Spectrum was equipped with different interfaces, so that finally all four players were able to held a joystick in the hand. The race I was able to win narrowly, but the victory crown was withheld from me.

So the day went by in a flash and we had been able to do almost nothing with our Spectrum. Fred and I therefore postponed a game of "Emlyn Hughes International Soccer" to Sunday, and at Saturday evening at 7 pm, we left the adult education centre (Volks-(Volkshochschule) to take part in the barbecue evening together. This was tasty and funny as always, in the end also favorable. Also the Sunday was well attended at the beginning, but the number of users decreased quickly around noon, many had a long journey home. We already made our way home at 12 o'clock and arrived at home at 6 pm, which was also pleasant, because the Monday work was waiting again.

I liked the new concept with lectures, which were all interesting. I hope that this will become established. So Wittenberg is always worth a trip and I was able to take home new knowledge besides the usual nice conversations. I am already looking forward to the next time.

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# ZX-VGA-JOY

## THE VGA INTERFACE FOR ALL ZX SPECTRUMS

### BY JOACHIM GEUPEL

The **ZX-VGA-Joy** is a VGA interface for the ZX Spectrum. With the ZX-VGA-Joy almost all display problems are solved. It is simply connected to the system bus of the ZX Spectrum and connected to a VGA monitor. In addition, the ZX-VGA-Joy has a Kempston-compatible joystick port, so there are no obstacles in the way of the players among us.

The ZX-VGA-Joy was developed by Goran Radan, a ZX-Spectrum enthusiast from Split, Croatia. As he states on his website, he finds the Spectrum's TV or composite video the worst. His goal was to develop low-cost hardware that would require as few components as possible and that could be connected to any ZX Spectrum computer with any type of VGA monitor without altering the original computer.

Original text from his website: *»I find it difficult to develop a solution around a modern, low-cost microcontroller that would generate VGA signals,*

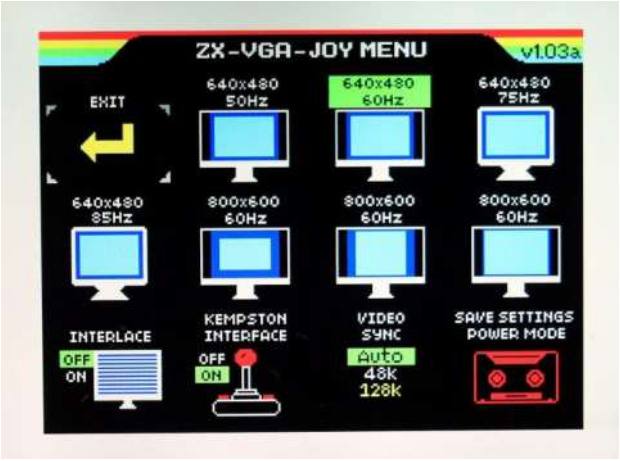
*capture video from the Spectrum bus, and manage synchronization of frame buffers. Ultimately, it is possible with the help of less fast logic ICs«.*

The ZX-VGA-Joy is produced in his company and distributed by SinTech in Germany, Great Britain and the Czech Republic.

**Operation**

On the upper /front) side of the interface there is only one button needed, which makes the selection of operating elements extremely clear.

The button has two functions: if the button is pressed briefly, the setup menu appears. If it is pressed and held for a long time, the logo screen of the ZX-VGA-Joy appears on the screen together with a note to the developer. A reset is performed when the button is released.




**The Setup**

The setup menu is mostly self-explanating. The operation is a bit irritating at first, but really easy to understand. The ZX-VGA-Joy is not operated with the cursor keys of the Spectrum. To make a change, move the selection frame to the corresponding menu entry by repeatedly pressing the button and simply wait until the setup menu closes again.

The setup allows you to make VGA-compliant settings, turn the interlace and joystick interfaces on and off, select video synchronization, and save the setup. After a short wait, the selection frame or the entry in a submenu flashes three times and the VGA-Joy automatically returns to the ZXS display. This applies to all menu items: the selected menu item flashes three times, the setup is accepted and the VGA-Joy returns to the Spectrum display.

The setup can be terminated with the first menu item. Short waiting time - the frame flashes three times and the ZXS display returns. No setup has been changed.

The next settings are seven different VGA modes. With these settings the VGA resolution and the VGA refresh rate as well as different combinations of them can be set. Here it is sufficient to move the selection frame to the respective entry by repeatedly pressing the button. Also here, the VGA-Joy returns to the ZXS-display after a short waiting time and the setting is taken over. The VGA mode settings remain even after switching off the ZX Spectrum.

It can be useful to try out the different modes. On my various monitors, all of them TFT screens, strange effects sometimes appeared. For example, in one resolution setting the image was only distorted or only partially displayed. So it's worth trying.

A special feature is the first VGA mode *»640x480/50Hz«*. If the selection frame stops on it, a pull-down menu opens, with which a fine adjustment of the refresh rate can be made. Here, the repetition frequency can be fine-tuned from 50Hz to 50.11Hz in 0.01Hz steps. It is possible that various TFT monitors react sensitively to this.

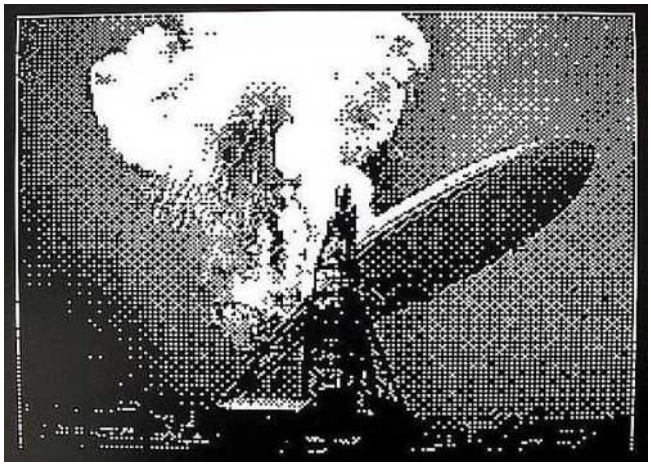
Please note: Under certain circumstances, no image is displayed. The only thing to do is to switch off the spectrum and restart it - at least for my system. If this dont work, press the Button for longer than threee seconds and release it - a full reset of the ZX-VGA-interface will set the Interface to 640x480/50 Hz.

In the lower row there are three setups which are not saved after switching off the ZXS. These settings have to be saved permanently with the fourth setup entry "Save Settings/Power Mode".

Also here applies: by pressing the button the setting is toggled. After each return to the ZXS display the selection is changed: the interlace is changed from OFF to ON and back, the joystick interface is switched on or off and the video sync mode toggles from *»AUTO«* to *»48k«* and to *»128k«* sync. May everyone find out for himselve what is best for him/her. I leave the setting at *»Auto«*. The interlace is to be noticed by the way immediately: after switching on, the screen gets stripes...

It is important that the settings of the different video modes do not refer to the image resolution of the ZX Spectrum. With the Spectrum, the resolution remains the same - 255 x 192 pixels. The given resolutions always refer to the VGA resolutions of the connected displays. A 14" or 15" display with 640x480 pixels may be used to full capacity. A monitor greater than/equal to 17" has no problems with this, the higher resolution can also be set here.

Example 1



Example 1

The last menu item has a double function. After selecting the entry, a pull-down menu opens again. The upper part contains the entries *»Save Settings«* and *»Exit«*. These are self-explanatory. If "Save Settings" flashes, the three previous settings are saved, *»Exit«* exits the menu without any changes.

Below this are the entries *»Low Power ON«* and "Low Power OFF«. This setting is the semi-automatic screen saver of the ZX-VGA-Joy. If *»Low Power ON«* is selected, the display is switched off immediately after leaving the menu and is switched on again after pressing a key. Semi-automatic because this function is only executed when the setup has been exited.

A special feature is the interlace mode. It affects all screen modes.

Interlace mode is deactivated by default and it is recommended to leave it deactivated for all programs that do not use interlace effects.

When interlace mode is disabled, the ZX-VGA-Joy provides an output frame rate of 50 Hz with original resolution (256x192), which displays each PAL field as a full VGA image.

When interlaced mode is enabled, even PAL images appear on even VGA lines and odd PAL images appear on odd VGA lines. If the software is smart enough to output different data for each field, this mode effectively doubles the (vertical) image resolution (256x384). However, I could not test this due to a lack of appropriate software.

Due to the limited possibility on old CRT televisions to show single images over a longer period of time without building up a new image[(1),] flickering may occur when running interlaced effect software, which is not the case with ZX-VGA-Joy. The output is progressive, both fields are buffered and transferred as single frames.

If the interlaced effect is not used by the software, which is the case for most of the ZX Spectrum software, and interlaced mode is turned on, the image will look as if it has a line spreading effect as mentioned above, so it is recommended to disable interlaced mode in the manual.

The ZX-VGA-JOY runs without problems with all interfaces of the Spectrum, because the signals are more or less passively tapped from the bus and no driver software is needed. The only disadvantage is that the Edge Connector ends in the ZX-VGA-Joy, so for example the DIV-MMX Enjoy! can only be connected via a bus splitter, e.g. the *»ZX-EXT«*.

My conclusion about the ZX-VGA-Joy is: connect and be happy. It's very easy to use and it works on

the ZX 16/48, the ZX 128 Toastrack, the ZX 128 2grey and ZX 128 2A as well as on the Harlequin 48 and 128. I couldn't test the Spanish ZX Spectrum versions for lack of one. For all others: All

ZX-VGA-Joy, connected via a bus splitter.

display problems are solved in one interface - VGA monitor presupposed.

The current firmware version is V1.03a. For owners of interfaces with version 1.02 an update for download is recommended. The update is not easy to install. A detailed manual is available with a video on the ZX-VGA-Joy page of Goran Radan's ZX-VGA-Enjoy page.

*http://zx-vga-joy.com/*

to find the right one.

JG

(1) The picture of a picture tube, as it is used in old televisions or monitors, is built up line by line from top left to bottom right. For this purpose, an electron beam runs in the direction mentioned above over the luminous layer which is attached to the inside of the imaging surface of the picture tube. This luminous layer has only a relatively short afterglow time. Each PAL image is constructed as a field. First all odd image lines, i.e. 1,3,5, etc., are built up, then the image with even numbering, i.e. 2,4,6,8, etc., is built up. The overall image then consists of the two fields, which are clearly visible due to the afterglow time of the luminous layer. If different information is displayed in the two fields of the total image, the image flickers unpleasantly.

# REPAIR OF LOWER RAM IN ZX SPECTRUM 48

BY JOACHIM GEUPEL

Some time ago I switched on one of my ZX Spectrum to run the program for calculating a fractal graphic found in issue 75/222. Up to now I only used the emulator "EmuZWin", which has the advantage that the clock frequency can be increased up to factor 10000.

Since the program is completely written in Basic, it takes quite a long time on a real Spectrum. So I let it run overnight to see the result the next morning.

But the next morning I didn't see any graphics, but only the well-known colorful and feared tiles. My first thought was a very well-known and in Germany very popular insult word, which describes excretions. In this case the swearword was still provided with an exclamation mark.

**Troubleshooting:**

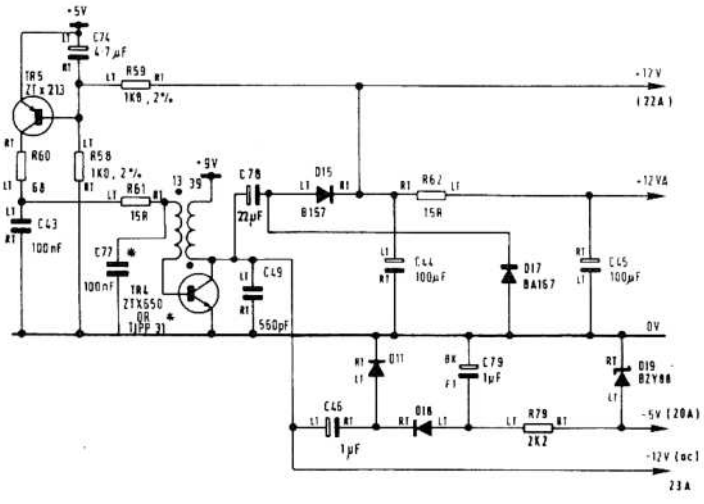
The second thought was, "What happened?" It can actually only be the negative voltage, the -5V, which is generated internally in the spectrum.

To check the suspicion, I measured the -5V at pin 1 of one of the RAMs of the lower RAM - and in fact, the voltage was not measurable resp. clearly smaller than the required -5V.

**Explanation:**

How is this voltage generated?

Most of the members of the SUC will know that, for those who don't, here's a brief description.



Circuit section of voltage generation

The +5V generated by the voltage regulator is applied to the emitter of TR5 and supplies via TR5 the current for the oscillator formed by TR4, the capacitor C77 and the coil. The primary side of the coil leads to the base of TR4. The secondary side is connected both to +9V, the voltage coming from the power supply, and to the collector of TR4. The collector of TR4 generates a phase rotation of 180°. This phase rotation causes the oscillator to start oscillating at all. C77 and the coil form the oscillator, which oscillates with approx. 5kHz.

This oscillation is directed to the charge pump consisting of C46, D11, D18 and C79 and the negative part of this oscillation is rectified there. The generated negative voltage is somewhat uncertain as it depends on the voltage of the power supply.

This negative DC voltage is stabilized to -5V by the voltage stabilization of R79 and the Z-diode D19 and should then be measured at pin 1 of the RAMs of the lower RAM.

Since this voltage was too low or missing, I assumed that one of the transistors had given up his earthly existence overnight and disappeared into the transistor sky.

A check of the transistors did not show any error. The transistors were ok - and because I was already there, I checked the diodes right away. Also these were ok.

So only the RAMs came into question. Maybe the capacitors between -5V and GND, i.e. C1 to C4, would also be in question. These would have been broken and could have had a short circuit. But the capacitors don't fail. They are among the most durable components in the Spectrum.

So I desoldered one RAM after the other. After each desoldering I checked the voltage at pin 1. Actually several of the RAMs were defective, the voltage was measurable again at the empty solder points. So the RAMs were defective - the error was found. The defective RAMs had so heavily loaded the -5V branch of the voltage that it collapsed and could no longer be measured.

**Search for replacement**

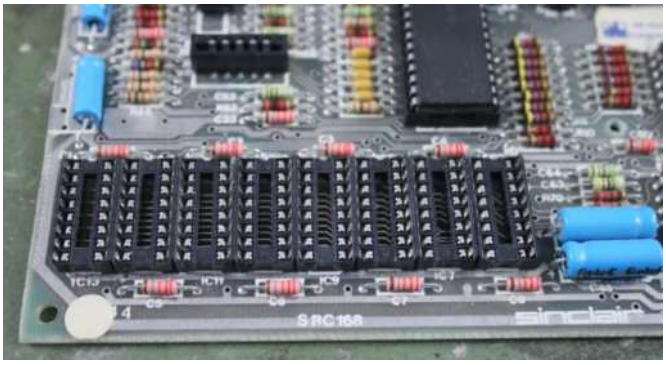
The search for 4116 RAMs was somewhat difficult. Again Thomas and hope for a few percent discount :) I didn't have. All RAMs offered on Ebay had the same age as those in my Spectrum 48.

I finally found the replacement on "SellMyRetro" on the page "Spectrum/Hardware": the "ZX Spectrum 4116 lower RAM replacement module". For just under 13£, i.e. slightly more than 14.50 € plus postage, it was more than half cheaper than the RAMs offered on Ebay. The large number of positive reviews finally convinced me. I ordered the module.

**Repair:**

I am the lucky owner of a desoldering station that made it easy for me to desolder the RAMs. I replaced the desoldered RAMs with 16pin IC sockets with spring contact. The spring contacts are necessary because the pins of the LowerRam module are too thick for precision sockets with turned pins. When desoldering you have to work with

The picture shows the board with soldered IC sockets



care, because the glue, with which the tracks are glued on the carrier board, is also aged again the whole rest of the computer. Due to the heat, the adhesive becomes soft again and both the solder eye and the conductor track are detached from the circuit board. Here you have to work with care and patience.

There are only three ICs and a few capacitors on the module: A LogicIC, a huge RAM and an IC, which I assume is a voltage regulator for the RAM. The whole module takes up only as much space as the LowerRam ICs did before.

On the left side of the module is the imprint "TOP LEFT". This imprint indicates the direction in which the module has to be plugged on. Not all contacts of the IC socket are required. However, it is necessary that the pins are inserted flush into the IC sockets. The contacts that are not needed are printed on the left as well as on the right. These must be inserted in such a way that they are flush with the IC sockets.

The result of the repair is positive. The repair was successful and the Spectrum is running again.

The underside shows the connection pins with which the module is plugged into the sockets

The exchange of the upper RAM area is by the way very similar. I also exchanged these RAMs just to see if it works. It worked.

During the whole rebuild I noticed that I already had this spectrum several times on the handicraft table. I had to change the ULA right at the beginning. I belong to the lucky people, in whose part shelf these ICs are.

The shape of the cooling plate was also somehow quite untypical. The bends were such that it was not possible to put an interface on the edge connector. As a result, I replaced the fixed voltage regulator 7805 with a 5V DC-DC converter. The IC has the advantage that it hardly gets warm. So the heat sink can be omitted.

JG

The picture shows the converted ZX Spectrum 48

# »LIFE-TERM« ADVENTURE SOLUTION

## BY HARALD LACK

Hello dear adventure friends!

Yes, here is again a new adventure solution for you and this time I have chosen the program "LIFE-TERM". It was released by "Alternative Software Ltd." for the Spectrum in 1987 and is another representative of Charles A. Sharp, who wrote several Spectrum Adventures. It appeared among other things on the B side of the program collection "4 Most Adventures" and was created with the help of the "Grafic Adventure Creator". As far as I know, there were further versions for the Amstrad CPC and the Commodore 64.

But what is this adventure about? Here the background story in short:

In the year 3142, i.e. in a relatively distant future, the democratic system of government collapsed and was replaced by multi-planetary trading companies (similarities with real conditions would be purely coincidental). However, these billion-dollar companies had only two goals. The eradication of all competition and one's own greed for success and wealth (may well seem familiar, may it not?). Any legal system was eliminated and all state power was in the hands of the trade police, who had to find the balance between the factions over sovereignty in the state. The rich were doing very well (hard to believe), the others had to see how they organized their lives. So theft, fraud and corruption were the order of the day. On 14.03.3147 the complex computer systems of the "Flo-Tec Trade Union" tracked down an intruder. Immediately the security forces were mobilized to eliminate the intruder. There was a fierce firefight in the course of which a Security Guard was killed. The intruder escaped. Here the player comes into, because he embodies none other than "Jake Stalin", who was about 13,000,000 miles away at the time of the crime. This fact doesn't help us much, because despite this fact, we are picked up, found guilty and sentenced. Since the death penalty no longer exists, we receive the maximum penalty - lifelong on the planetoid "Souzel" to dismantle building material. Is there a way out for us?

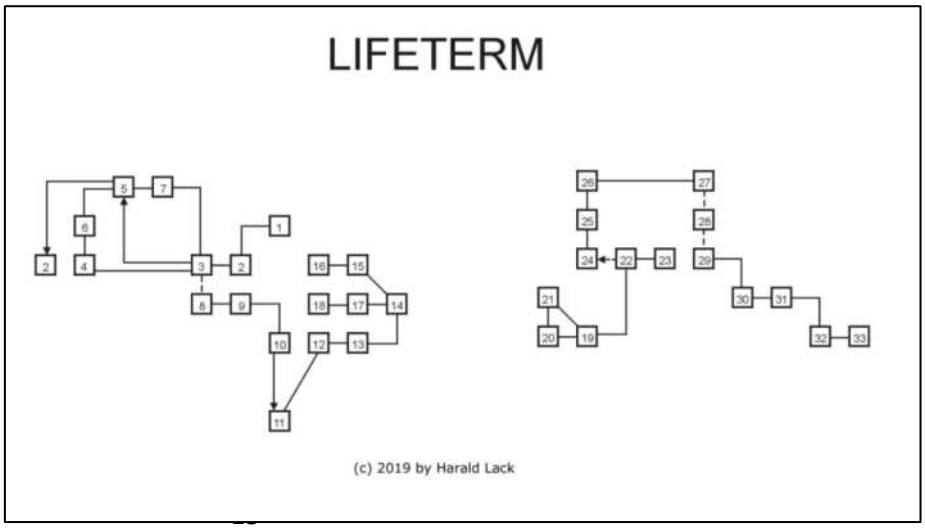
Well, so far the background story. Of course you will say, there must be a way out here and we will now look at it together in the framework of my proposed solution. As you can see from the attached plan, we're in "only" 33 locations, which makes the adventure a little bit clearer. Nevertheless, there are some tricky puzzles to crack to get

ahead. In the run-up however - as you are used to it from the past - again the listing of the locations with the items in it (some useful others rather less:

01) The sleeping quarters / pen, calendar, jar of chlorizam tablets, bottle of liquid, clothes, pillow, bunk
02) The living area / desk diary, magazine, hat, maint-droid, sink, bath & toilet, DSC
03) The landing pad
04) The converter - the waste stretches as far as you can see into a harsh and unyielding horizon - to the east lie the landing areas
05) Atop a pile of refuse / environmental sustainer, doll´s hair
06) Waste lands stretch as far as the eye can see painting a picture of loneliness and desolation
07) Atop a mound of refuse - down below is a landing area / glue
08) The airlock / ID scanner, space helmet
09) The long corridor leads east / ventilation hatch above
10) The engine room - the vast engines thrumm with life and the air smells of burning plasma, workshops are nearby and hold
11) No. 1 hold / plastic explosives, detonators
12) The workshop - the refectory lies east / cylinder of nitrous oxide, wax, wire
13) The refectory - steps lead up to the bridge
14) The bridge A / maint-droid, hatch, control console
15) The gyro-sleep chamber
16) The crew´s quarters / explas weapon, safe, 1000 thracian dollars, detonators, explosives
17) A corridor - a doorway opens to the east and the crew´s quarters lie north
18) A long corridor leads east / ventilation hatch above, pirates
19) A corridor leading east to the hold and west to sick-bay
20) Sick-bay
21) A storeroom - the sick-bay lies south / sonic generator
22) A corridor - steps lead up to the observatory and a doorway leads east to the bridge
23) The bridge B
24) The interview room / police officers
25) A corridor leading south to the crew´s quarters and north to the computer room
26) The computer room / banks of computers
27) The armoury - the bridge lies south east
28) The holding cell
29) The holding cell on the planet Fortrax / hole
30) A sewer
31) The sewers / hole
32) The subway echoes with the distant sound of the speeding cars
33) The subway station / man beside the tracks

So, these were already all locations and objects of my solution. Let's start now with the step-by-step solution of this adventure. As you can see it's all relatively fixed.

→ D,
→ Send SOS,
→ W, W, E, U, D, U, D,
→ Look,
→ Lock Pilot In Storeroom,
→ Send Droid To Ship,
→ W, W,
→ Get ID Card,
→ N, U,
→ Dig,
→ Get Hair,
→ E, Dig,
→ Get Glue,
→ Stick Hair On Face,
→ Drop Glue, D,
→ Enter Craft,
→ Insert ID Card,
→ E, D,
→ South,
→ Get Explosives,
→ N, E, U, NW, W,
→ Drop Explosives,
→ E, SE, D, W,
→ South,
→ Get Detonators,
→ N, Get Wax,
→ Get Wire,
→ E, U, NW, W,
→ Set Detonators,
→ Look,
→ Get Money,



→ Get Weapon,
→ E, SE,
→ Tell Droid To Fly Ship,
→ W, W, E, W,
→ Insert Wax In Ears,
→ Pick Lock With Wire,
→ W, N,
→ Operate Generator,
→ SE, U, E,
→ Fly Ship, Fire Weapons,
→ W, W,
→ Bribe Officer With Money,
→ N, N, E,
→ Look,
→ Fire Weapon,
→ Look,
→ D, E,
→ Fire Weapon,
→ Look,
→ D, E,
→ Save Mans Life.

Through this generous act we are rehabilitated and can rejoice in our newly won freedom. How quickly you can become a hero?

That´s it already for this time. Have fun playing and/or fiddling around.

# ARTIFICIAL INTELLIGENCE
## AN APPROACH TO A DIFFICULT TOPIC
### BY JOACHIM GEUPEL

The term *»artificial intelligence«* is a buzzword of our time. The "expert system" 20 years ago is now referred to as *»artificial intelligence«*, or *»AI«* for short. One difficulty is that no one knows exactly what "AI" actually means. A second difficulty is that this term is not exactly defined. Nobody knows where automation ends and where artificial intelligence begins.

It's much easier to explain what "AI" isn't: a motion sensor that turns on the light outside your front door at night is definitely not an »AI«, even if advertising says otherwise. Even the electronic control of the largest model railway in the world, the *»Miniature Wonderland«* is not an *»AI«*, it is an *»intelligent simulation«* that 'only' controls the system, even if it does it very well. Trying to have an intelligent conversation with her according to Alan Turing's Test[1] is impossible.

The garage door that detects and stops at obstacles while closing is not an *»AI«* either. This is only a control or regulation.

This enumeration can be continued at will. We don't even notice that the advertising is lying to us all the time, because this term "AI" is being thrown around every day. Everything that is available to us in terms of interactive electronics only has a very limited connection with »AI«. *»Alexa«* may come relatively close to it.

The keyword »artificial intelligence" and our understanding of it are very much influenced by the *»Matrix«* trilogy. The intelligent machines that react both interactively and emotionally to every situation are clearly a product of the imagination and have nothing (yet) to do with the present - even if the trilogy is a fascinating and exciting piece of cinematic art.

In order to approach the term *»artificial intelligence«*, it is necessary to first look at human intelligence[2].

Each of us has an *»I-consciousness«*. This ego-consciousness is what distinguishes us from machines, even if they have passed the Turing test. *»I think - so I am!«* - a machine does not think. Its operations run according to previously defined parameters within the framework of one or more programs[3]. These parameters can change permanently and their number can be extremely large. One or more learning algorithms ensure that the program can adapt individually. But all this happens only within the framework of the given programming and has nothing to do with ego-consciousness.

We clearly define our intelligence through our *»Emotional Intelligence«*. Only a few actions are influenced and determined by logic and the result of previous thinking. Normally the "gut feeling" is crucial for our actions.

The reason for this is, how could it be otherwise, the structure of our brain.

Our *»Mesolimbic system«* is involved in almost everything we do. This *»Mesolimbic System«* developed before the cerebrum and is responsible for many of our reactions. The *»Mesolimbic System«* is our *»reward system«* that is involved in the emotion *»joy«* and is located in our midbrain. Even if we write a program, which is more or less known to us as friends of the ZX Spectrum, and have to proceed strictly logical, the *»mesolimbic system«* gives us a feeling of joy when it works. It ensures that endorphins, the messenger substances in the brain that make us happy - and addicted - are released. Thus our *»logic«* is also influenced by emotions, even if Mr. Spock and his volcanic buddies claim the opposite.

All those computers and robots with their supposed feelings are simulations based on pattern recognition. A laughing face shows eyebrows drawn up and corners of the mouth drawn up. A cheerful face shows a combination of certain features that clearly distinguish it from a sad face. These facial features are evaluated using pattern recognition algorithms and the individual response to the output of the computer, speaker, screen or robot mask is adjusted accordingly. Among other things, this pattern recognition has its origin in character recognition, in which arcs, angles, straight lines and combinations thereof must also be recognized, assembled, interpreted and, if possible, give an output as meaningful text.

An essential part of our understanding and intellectual performance is pattern recognition. We are absolute experts in recognizing patterns of any shape and type. This extends not only to the moment, i.e. to the temporal now, but over the period of our entire life. We can also recognize spatial patterns, even if we have only one eye. We are able to recognize patterns everywhere, even where it makes little sense. Think of cloud formations in which a face, a form or an animal can be seen. For us it is easy to grasp complex connections, to evaluate them and to react immediately and individually to them. We are also able to recognize correlations, i.e. patterns, over a longer period of time. Criminalistics is a good example of this. The success rate of enlightenment depends on recognizing correlations and temporal processes and evaluating them logically, merging them with evidence and finally enlightening a case. Absolutely everything in our existence, reading, writing, making music, arithmetic, can be traced back to the ability to recognize patterns[4].

*»Artificial intelligence«* attempts to recreate structures of human abilities and behaviour[5]. However, human behaviour is very complex. It is therefore very laborious and extremely complicated. It takes years of research and development to get to the point where a car can be driven autonomously. What we can grasp at a glance requires sophisticated programs and enormous computing power to reproduce it mechanically. Everything that has already been put into our cradle[6], i.e. recognising patterns, learning from them and reacting individually to them, is recreated with a lot of work, engineering knowledge and imagination.

If a car can then actually drive autonomously, it is far from being able to have an equally intelligent conversation at the same time. All computing power is occupied with recording the environment via the necessary sensors, drawing conclusions, making decisions and reacting individually to them.

Assuming that everything works, this has nothing to do with *»artificial life«*, to which *»artificial intelligence«* is often equated. The *»Matrix«* trilogy here represents *»artificial life«* rather than *»only« »artificial intelligence«*.

*»Artificial consciousness«*, with which *»AI«* is often equated, is science fiction and lies far beyond the reach of modern science. This is where metaphysics, philosophy and theology come into play. No one knows what makes up our consciousness at all. Does our consciousness have anything to do with soul, the "divine spark"? What does it matter and what qualities are necessary to let us recognize that we are ourselves. *»I think -so I am«* is not enough here.

In summary, *»artificial intelligence«* means automation at the highest level. This level includes recognition, learning, decision making and situational reaction in all conceivable scenarios and

situations. The goal of building a machine that would react intelligently, i.e. like a normal human[7] that also is able to make human ethical and moral judgements, cannot be realized with modern technology.

The current technology allows us to create systems that make decisions and react individually in the context of their programming, which also includes learning ability. Any moral, ethical and emotional decision is a predetermined pseudo-decision that has nothing to do with actual ethics and morality.

Thus *»artificial intelligence«* is the attempt to recreate something that we as human beings can already do.

This article goes far beyond the dangers of automated decision making. The report by Ranga Yogeshwar, *»Der große Umbruch«* (the great transition), which was broadcast on ARD on April 12th, 2019, in german television shows the state of the art and has been thoroughly researched. It is available on YouTube at

*https://www.youtube.com/watch?v=ltF3kKY073A*

The Wikipedia article »Artificial Intelligence« is very informative and highly recommended.

*Vogel Buchverlag* published the book *»Start in die künstliche Intelligenz mit dem ZX Spectrum«* in 1985 as part of the magazine HC Home Computer. Its cover picture can be seen at the beginning of the article. It deals with artificial intelligence within the scope of the ZX Spectrum. This book deals extensively with pattern recognition. An extensive program, which also contains assembler parts, can be typed in.

The second cover picture shows the book *»Das Zeitalter der Künstlichen Intelligenz«* (The Age of Artificial Intelligence), which deals with *»AI«* much more extensively than the book presented above. Here also marginal areas like fractals, robots and raytracing are explained. In how far fractals and raytracing have to do with AI, is not answered here.

Both books are only available antiquarian.

At the end I would like to thank Dr. Ing. Simon Kiefhaber, who proofread this article and checked its accuracy. He also checked the spelling and grammar. Thank you very much!

Joachim Geupel

*(1) Wikipedia writes: "In the course of this test, a human questioner conducts a conversation with two unknown interlocutors via a keyboard and a screen without visual or auditory contact. One interlocutor is a human being, the other a machine. If, after the intensive questioning, the questioner cannot clearly say which of the two is the machine, the machine has passed the Turing test, and the machine is assumed to have an ability to think equal to that of a human being.*

*This test has already been passed by computer programs. In the summer of 2017, researchers at the University of Chicago presented an "AI" that independently writes reviews and, together with human-made reviews, presents 600 people. This test group could not distinguish machine reviews from human reviews. So the test was passed. (Source: Wikipedia - Turing Test)*

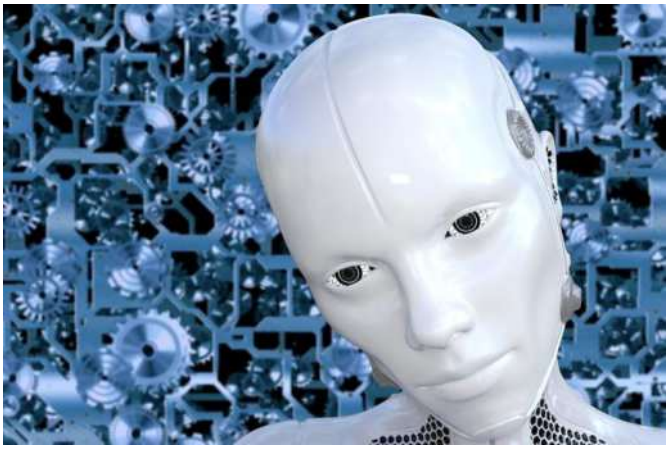
*(2) Here the intelligence of the individual is meant, not the intelligence of the mass, which is known to be inversely proportional to the number of persons.*

*(3) Here the big operating systems like "Windows"(*), "Linux" or "Android" are mentioned. These are not only based on a program, which is called so. They are whole program packages that work together and that do not function at all or only insufficiently without each other.*

*(4) Enter the keyword "pattern recognition" on Wikipedia or in an Internet search engine.*

*(5) Wikipedia "Artificial Intelligence".*

*(*) "Windows" is a registered trademark of Microsoft. All rights to "Windows" are owned by Microsoft.*



# SOFTWARE 2017

## BY THOMAS EBERLE

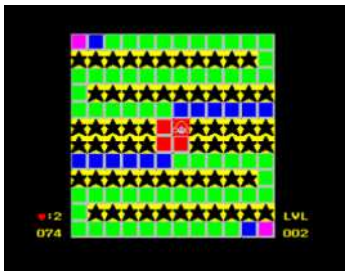
Hello, folks,

after I had to end abruptly last month in order to not miss the editorial deadline, I want to discuss as many programs as possible this time. Not an easy thing, the flood of software doesn't stop, I'm looking at more than twice as many programs as I'm discussing here, so here's the choice of better programs.

## GAMES

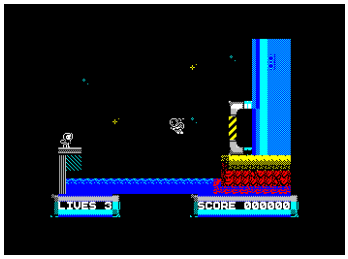
I ended May 2017 last time. So it goes on with June. There were lots of interesting games again.

### Walkabout - Bob Fossil



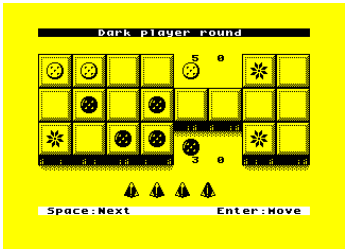
The game principle is actually very old. You run over fields to your destination. The fields have different colors, blue fields can only be run once, green fields can only be run twice and so on. In the end all fields have have to be visited and that's the tricky part. The game differs from others by the differently colored fields, but in my opinion, this has also happened once before. But it's well done. But my point of criticism is that it is explained nowhere what the colors mean, "learning by doing". Not exactly in the sense of a software tester for whom many other programs are waiting. Sound is not available, graphics very simple, but do the trick. Have a look at this game, the levels are quite tricky.

### Blimpgeddon - Ultranarwhal




Blimpgeddon is a typical Jump´n Run game, which is played over several levels, left, right, up and down. It seems to me that AGD hasn't been used, because the collision query is a bit more accurate...too accurate. The sprites change very softly and pixel by pixel, but good eyes are necessary to make exact jumps and to land with a lot of joystick feeling exactly at the right place. One millimeter too much and you touch the wrong spot and you're done... a life away. The game is graphically very good, really complex. There is no sound in the game other than jumping noise, which is a pity, but good for concentration. The difficulty level is very good. Too high, I think, which doesn't meet my never-ending frustration limit. But everyone else is welcome to try one of the better games of this genre.

### The Royal game of Ur - Rikokun

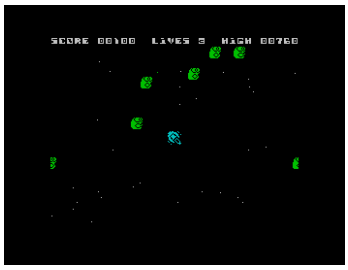



The older ones may remember this game... those who are already over 4600 years old, who are so old to know this game in its board game version. So, the Spectrum version took a long time, was it worth it? The game is really very interesting, in principle an antique game of Ludo. It doesn't have much to do with strategy, rather with luck on the dice. Here I find dicing a bit annoying, it takes a long time and makes creepy noises. But apart from that, it's fun. Board game fans can definitely take a look at it.

### The Adventures of Jane Jelly
### The Treasure of Zedin - Jaime Grilo

I had a conversation last year as part of an investigation into female video game heroes. The best-known heroine, Lara Croft, has not yet shown up on the Spectrum, unofficially and visually, but the heroine Jane Jelly should slip into this role. First and foremost, it is a typical multi-level platform game. Several keys have to be found. Once you have found everything, all you have to do is get to the exit. With ladders, or by jumping one moves also from top to bottom or the other way around, the labyrinth is very complex and the solution surely requires the drawing of a map. Also, the graphics are good, in addition a cool sound. It's just not a new game idea. Nevertheless, a good representative of this genre. There is also a sequel (The Adventures of Jane Jelly - The treasure of hot marmelade), but in principle it is the same game with new puzzles.

**Genblast! - Dave Hughes**

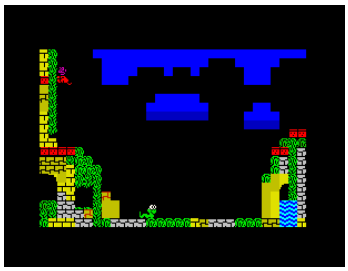


Shooting for a change. Genblast! is a kind of Meteorids clone, but without all the extra toppings. You don't have a shield, you can't teleport. The opponents don't divide into smaller opponents either. The goal is to shoot down all aliens on the screen. Quite simple, actually. The control is simple, the collision detection is exact. The graphics are simple and sound only consists of shooting noises. The game is short-lived, you don't have to think long, you just have to shoot. Well done and sometimes just the right thing for in-between.

**El Matadero - MeatBallTheory**

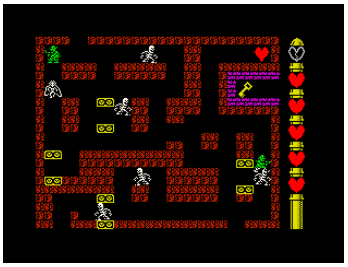
Oh, dear, I thought at first. What's that supposed to be? This Spanish game comes without instructions and I thought the controls were broken at first. Then I found out that this game is only played with one key. Story: The sheep has to escape from the slaughterhouse. As sheep are, they only run straight ahead. So, the only thing you can do is jump. The whole thing looks like a mixture of platformer and Jump´n Run. Sometimes you have to jump to the correct level to not end up in a meat grinder, another time you have to jump over your opponent at the right moment. The jumping slows down the speed to a standstill, otherwise the sheep keeps running. In the end, you have to memorize the levels to pass. Very fast action, well done, graphically and sound technically rather weak, but it's fun. Baa!

**Monkey J - The treasure of the gold temple Gabriele Amore**



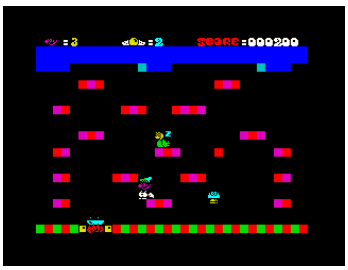
Gabriele Amore prefers to use AGD for his games, in the past also with multilingual menus. In the present work he has done without this, but not without detailed graphics and good ideas. The result is a hectic struggle for survival of a small monkey. In the best Jump´n Run manner, the colourful monkey jumps, runs and climbs through the pictures, each followed by a snake or other opponents. Exactly that was the point I didn't like. Because you're constantly being pursued, you can't develop a strategy to reach your goal. On the other hand... there is no limit to lifes. If you get caught, you reappear on the same screen. Some people will like the hustle and bustle more than me. If you like it, you will definitely get a game with a high degree of difficulty, colorful detailed graphics and a great soundtrack. I don't think the animation is that good, but on the other hand, who knows exactly how monkeys move. There is no disadvantage in playability, if you like challenges, you can face them here.

**Sorceress - Payndz**



Probably also under AGD this labyrinth game was created. It doesn't have any outstanding graphics, annoying sound effects and actually nothing special except that it's quite fast. The idea of the game is to sneak through a labyrinth and touch as few enemies as possible, because each touch costs one of the six hearts you have. You can fill the hearts, but that's the strategy of the game. Once used up, you don't have the hearts to go back. But you also need them, because sometimes you can't avoid touching them. As I said, the game is quite fast on its way. With so many opponents, you sometimes need patience for the right moment. The opponents don't pursue you, except for a few biting hellhounds that run off for a short time, but they calm down again. Altogether worth to have a look, even if less nerve killing effects and a nice AY sound would have done the game good.

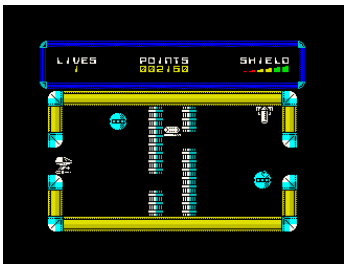
**Omelettes for breakfast - Gabriele Amore**



Another fun game from Italy, Gabriele is currently dedicated to the famous superhero Mario. This time Mario wants an omelet for breakfast. But where do the eggs come from? From the chicken, of course. Once briefly strangled and it is convinced. Now quickly put the egg in the pan before the egg thief... oh no. The screen is quite simple, the sprites are all the more colourful. The animation is very funny, Mario always loses his cap for a short

time when he jumps down. Highlight is the AY version of the "Sonderzug nach Pankow" (rather the US classic “Chatanooga Choo Choo”). The game doesn't lack humor and ideas, even though the egg hunt is almost harmless, it remains a challenge to beat the eggs in the pan. There's even more variety in extra Levels. Take a look and have fun!

**Hyperkill - Mat Recardo**

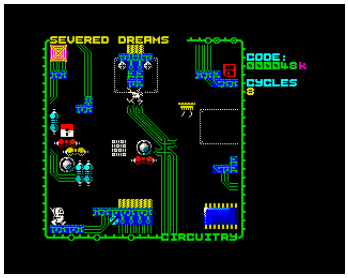



You know how to shoot through labyrinths since Cybernoid at the latest. At least the spaceship fuel resembles the famous predecessor in this game, but otherwise not much. Also here you have an attraction that lets the spaceship sink down if you don't steer against it. This increases the level of difficulty a bit, if you have to wind your way through difficult passages. In some cases the fast laser cannon or the extras you find will help. They can't be retrieved on demand, but are applied immediately when you collect them. The tasks are quite tricky but feasible. The graphics are not exceptional, but good, the sound is certainly not to everyone's taste, but cool and modern. A game that will find its friends, even if the concept is perhaps already a bit worn out (main thing is no Jump´n Run).

**Deep Blue - Igor Errazkin**

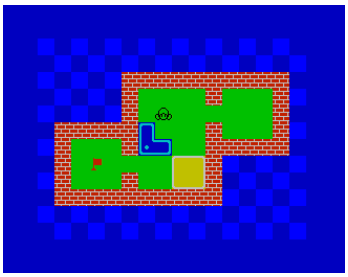
3D isometic game... it sounds like Ruf from the past. It is also very likely that the game was written with the 3D GameMaker from CRL from 1987. But it's a welcome change. The game is graphically quite well drawn, although, like all games in 3D GameMaker, the colors are monochrome. You may be a diver, but the air doesn't seem to run out. But there are a lot of tricky rooms to wander through. The degree of difficulty is quite feasible. It is noticeable that in some rooms with several sprites the speed drops rapidly. The sound effects still sound like 1987 and the gameplay is the same. Nevertheless... if you are looking for a trip into the past and don't always want to play Batman or Head Over Heels, you get a good alternative here.

**Circuitry - John Blythe**




It's another platform game, but I liked it. The task is quite simple. Collect some items and get to the exit. Well, only the task is simple, not the execution. Because it requires exact timing and jumps to get there. Joystick artists are in demand. The game does without sound, has only some nice effects, but it is very colorful and detailed. A good game, no more but no less.

**Knockabout - Bob Fossil**



The good thing about puzzle games is that you learn them while you play. So, in this game you have to take into account how the stones change when you move them and in the end they have to be moved so that the way to the goal is clear. The levels increase in difficulty and new stone shapes are added. Ultimately, however, everything can be solved with a little puzzling. There is no time limit, so, no hurry. The game has very simple graphics and sound effects, no music at all. You don't need them to concentrate either. It's still fun, but I found a bug. If you mess up a certain level, you have no other choice than to reload the game. Maybe there's a hidden key combination to end the game, I don’t know. Thanks to the level codes I didn't have to start over every time, but it was a bit annoying anyway. You could have made more out of it, especially in the graphics. But it's not necessary, it's playable and can keep you busy for some time.

**Sorceress 2 - Payndz**

I didn't think the first part was bad, but I didn't expect a successor. This game proves that a successor isn't always better. The graphics have been improved, but the whole thing has turned away from the more strategic maze game. You walk through the Sabre-Wulf-like forest and try to find

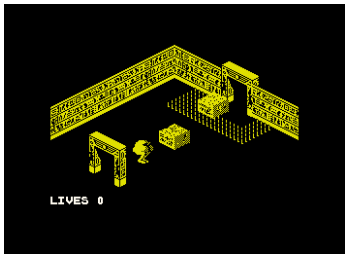
some rune stones. The hearts that were once the lifesavers, I couldn't find any more and so it changed from a somewhat innovative game to a 10.000 copy of Sabre Wulf. The hero can shoot now, but the enemies will reappear elsewhere and possibly exactly where you stand. Shooting around can also cost you your own life. That can quickly frustrate, therefore rather close to the recommended limit.

**Three Octopuses - kas29**

Oh, a maze game, that was my first thought. Completely wrong, this game is about something completely different. Three little octopuses want to go to their grandma. The jellyfish should help them to find their way and protect them from all kinds of dangers. So you take the role of the jellyfish. Fortunately, the little ones don't run off all at once, but one after the other. The jellyfish acts like a trampoline, the octopuses sink down and jump up when the jellyfish touches them. They always run in the last direction, unless they hit an obstacle. Then they turn around. But it's not just about showing the way, it's also about protecting the little ones. Dangers are depicted in red and cost the little ones energy. If there is no more energy, there is unfortunately an octopus less...

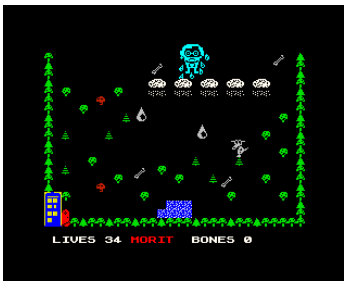
The game doesn't have any particularly elaborate graphics, but it's definitely worth seeing. The control works well and is exact. The game is a challenge, but it has the right degree of difficulty. In the game you have an AY soundtrack that fits and doesn't annoy. I had a lot of fun in the test and can only recommend the game. Finally, a new game principle, keep up the good work.

**Abu Sinver Propagation - Errazking**




The author Errazking probably likes 3D games. But if you think this is the sequel to 3D Blue, you're wrong. Although this game is also created with 3D Game Maker, the engine has been changed and improved and also the game idea is a different one. If you are still lost in 3D Blue through a labyrinth with several paths, only one way is possible here. Each room presents you with a new task to accomplish. A modification is also the number of lives, you now have nine of them. The puzzles are not too tricky, only require some thinking, sometimes also luck. The sound effects are still the same, but this time there is an AY soundtrack, which sounds very Egyptian and therefore fits the game. The graphics are much more elaborate than other games of this genre, and there's nothing else to complain about, apart from the fact that everything is monochrome and an improved engine should allow a bit more color. Also, the controls are changed compared to 3D Blue. I assume, however, that this corresponds to the possibilities offered by 3D Game Maker. I know it from earlier Iso-metric games that you turn left or right with two keys and run level with another one. Now you have four direction keys, a jump key and even a shot key. I haven't found out what the shots are good for yet, but that will come. It's always fun. All-round success.

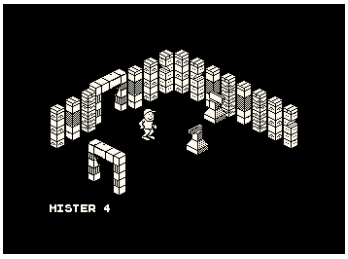
**Moritz... The dog that caught the car - Sebastian Braunert, Uwe Geiken**




I'd like to mention this game because it's something special. It comes from Germany from our reader Sebastian Braunert. About the game: There is a long story about Moritz, the dog. The task in the game is simple to outline: Collect bones and survive. The game is... I have to put it this way... an AGB platform game of the simplest kind. The graphics are simple, sound is completely missing. Already in the first picture I was annoyed by the raindrops that appeared completely randomly. You know that you are looking for a pattern to slip through an obstacle. There's none here. I've already tried AGD and made a game, but for good reason I never released it. It was only an attempt and first attempts are usually not so good. Sebastian put in more work and created many levels, but there is a lack of the game idea and the graphics. AGD does the rest in terms of collision detection and animation, so the whole thing works. I also think it's a good first try and I want to motivate you to keep going. But honestly, I can't recommend the game

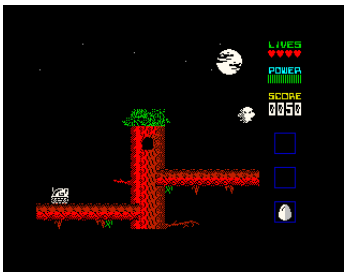
as a hit. The Spectrum can do much more... get started Sebastian!

**El Mundo de Mister Emulator**




3D Isometric games are probably on the rise right now. Here we have a Spanish representative, Javier Ortiz Carrasco has probably been inspired by Errazkin and also created a work with 3D Game Maker. This is the classic version, also with known limitations. So the engine is noticeably overloaded, if several sprites are in the game. The whole game then becomes very slow. A soundtrack is not available and the sound effects sound like 1987, which is not bad in general. The game itself is well designed, just with the means provided by 3D Game Maker. I present this game as a representative for maybe many more to come. It's the same as AGD... at some point it's boring to always be presented with the same game principle. So please don't all go for the 3D Game Maker now and certainly not for the one from 1987. That was just a long time ago and something has happened since then. Errazking proved this with his improved engine.

**Robot 1 in... The Planet of Death - Mat Recardo**

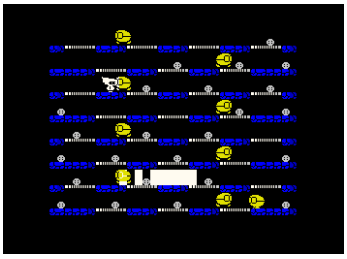



At first I thought it was a simple platformer, in fact it seems more like the introduction of a new hero to the Spectrum world, the small Robot 1 as new Dizzy replacement. Although the graphics don't seem to have originated from the same engine as Dizzy and his friends, the game idea is similar. There are several puzzles to solve, switches to flip and certain people to bring the right object. This already shows a first problem. The objects are not inscribed and hardly recognizable. There is already the idea not so easy, what one could do with it. I noticed another graphical deficiency while jumping, sometimes you have to jump quite exactly, but e.g. with the branches of a tree it is not quite clear in the graphical representation where the branch ends. This is much better solved with the model Dizzy. Nevertheless, I just like such action-adventures, there is more to them than clumsy jumping. Another advantage is that you can try your hand at it umpteen times. If you're not drowning in the water, a jump that goes wrong doesn't matter and doesn't cost you any life. The game runs on 48k, but plays a soundtrack on 128k Spect-rum, which accompanies the game well. Altogether a good start... I think there will be sequels.

**The sword of Ianna - Retroworks**

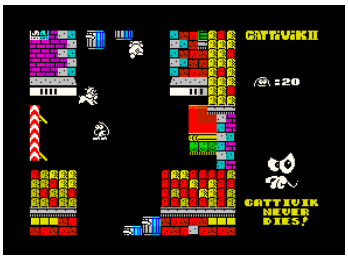
Oh, what did I miss? innovative game ideas, good graphics, good gameplay: another game from Retroworks. The sword of Ianna has everything you want from a modern game. The graphics are more than clearly different from what we commercial companies had served up in the 80s. The game is backed by a good mystical AY sound and may not be something completely new, but it has never been played in this form before. Once again a villain has to be defeated, our hero goes to the land of the enemy to face him. For joystick artists this is the first challenge, you can run, walk, or move carefully with a drawn sword. Each gait is controlled differently, with pressed fire button or without. Since you still need a button to pull out the sword, it is advisable to do without the joystick altogether and to go straight to the keyboard. The graphics are really excellent, colorful and detailed. The whole game makes a very well thought-out and professional impression. Especially the animation of the hero is great, no matter if jump or normal gait, everything seems almost realistic, Prince of Persia could have been the role model. For me it's definitely the game of the year, if not the best for several years. Definitely watch it. It's a multiload game with several levels. So it will be a challenge to convert it to various disc formats. Let's see if we can do it and the game will appear on Scene+.

**Biscuits in light - Dave Hughes**



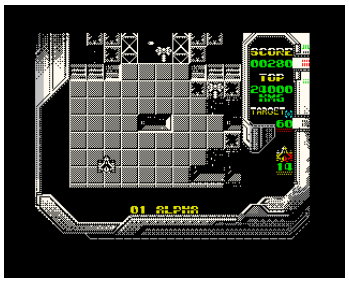
»Oh woe, a platform game!« was my first thought. As you know, as a tester I'm getting tired of the same game principle and want to see something new. See there... sometimes it's different than you think. The player runs here over different platform levels. There are two kinds of fields. The ones you just run over and the ones you can jump to a platform level above or below. The goal is to eat all the biscuits and not touch any enemies. They run quite uninspired from one side to the other, more difficult it becomes by a ray, which scurries times from top to down or from bottom to upwards over all levels. In the second level there are bombs that tick and then explode - you shouldn't be around. Some enemies don't move evenly anymore, but scurry towards you as soon as they discover the player. I haven't reached level 3 yet, despite the 128 lives you have. But I'll keep trying. The game has no game sound, but the effects come from the AY sound chip. The graphics are quite nice, but not outstanding, albeit quite sufficient, e.g. a background graphic would make the whole thing more confusing. I already have enough to do with constantly avoiding this beam and I can't write anymore, I have to continue playing. This is fun!

**Cattivik II (Cattivik never dies) - Gabriele Amore**




Maybe it's a promise that Cattivik adventures will go on and on. We didn't even report about the first game from this series from 2014. It's a typical AGD platform game and that's how the sequel looks at first. But as soon as the hero evolves from the underworld, he moves through the rooms in the manner of a maze game. So it goes on with a colorful mishmash, on the street a house maze and in the houses you jump from table to chair etc.. As usual you have to find objects to open doors. In the end it is a mixture of two well-known genres. Nice idea anyway. AGD does the rest, the controls are exact as always, the graphics are fine and nice, a bit too short, AY sound entertains us. Definitely have a look.

**Retroforce - Climacus**

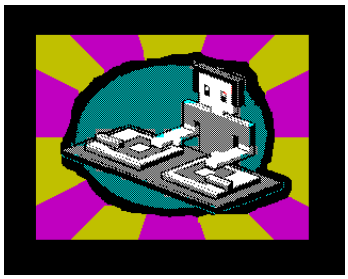



A game of shooters should also be mentioned. Retro-force is an old-school vertical shooter. Not that old-school, though - it is no Space Invaders or Phoenix, rather it resembles 1942, but located space. One shoots oneself through attack waves and collects thereby extra weapons. Very popular is the Smartbomb, which saved me several times and destroyed all attackers by touch. Some extra weapons are also included. The game is fast, appealing and graphically elaborately drawn. Here is also a little bit of a problem, because in some places the graphics are so confusing that I could only hope to fly somehow through it without being hit by something I could barely see. Now I'm not quite the typical shooter game fan, but although there are only shot noises in the game, I definitely think this one is a better one. Switch it off and shoot it in... or switch it on and shoot it off... no matter, try it on as big a screen as possible.

## DEMOSCENE

After the demoscene was neglected a bit in the last editions, we have a lot to do. Let's start at the end of 2016.

**4squares - g0blinish**



The first place at the Demosplash2016 was secured by g0blinish with this title. The demo has a progressive sound and offers a lot of effects I haven't seen before, but which didn't tear me apart. Every single effect is still better than I could ever do and the whole thing is well coordinated. Why the demo is named after four rectangles is not quite explained to me, even if rectangles occur. Anyway, the demo ends with trying triangles next time. Absolutely successful, even if the sound is a bit too monotonous for my taste.

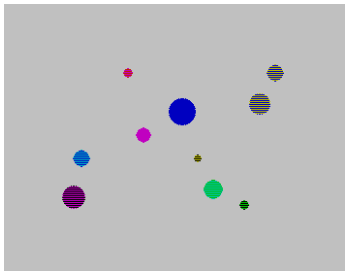
**Kkrktr17 - kowalski and n1k-o (Technolab)**

Only a mini demo, but still worth mentioning. The name could probably be translated as "Ki-keriki" and if that wasn't clear to you, you'll be made

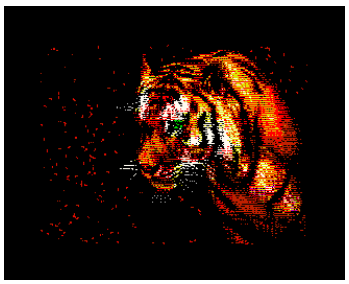
clear right at the beginning by a digital crows (?). I cannot explain the exact background for the choice of a cock, but the cock, which appears there on the screen, is top-notch... In Multicolour it scrolls in oversize from top to bottom and later also changes size and appearance. In short words, the usual demo texts like greetings are displayed. The sound is pleasant and short, but never boring. It's just a mini demo. But I'd like to see more of it.

That was now also the best demo for the turn of the year. There were some, but most of them were presented at the DiHalt in January 2017. And there we are now already in the new year.

**Prof4d - Kpacku**



It's unusual to see such an elaborate demo that didn't take part in any competition. Once again Kpacku outdid himself. The demo offers a lot of graphical tidbits, mostly in multicolour. Impressive are the quantities of small multi-colour balloons and the tiger, but there is even more, such as balloons that show up and burst immediately. The sound is absolutely appropriate to the successful animation effects, light and entertaining. I miss the ending a bit, the demo continuously starts all over again.



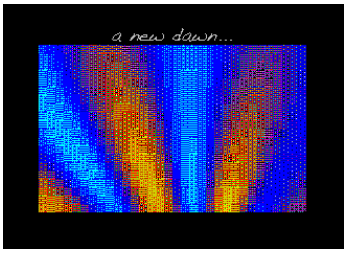
**TbMA -sibCrew**

We're already in the middle of the Russian DiHalt party. If you don't know exactly what the name means, "DI" is the assembler command for "disable interrupt". "HALT" means wait for the next interrupt. It is the combination of assembler commands that forces the computer into an endless loop... Endless is also the list of demos. We can't dicuss all of them, but we have to introduce them here. Here, one graphic effect follows the other, accompanied by absolutely suitable and cool varied music. No space is left for the border, which is also used for the effects. Colourful colour effects are not missing either, including multicolour. A really good ending crowns the whole thing. The only short-coming I have to criticize with almost all Di-HALT releases: The Russians don't care about other formats, everything is released on TR-DOS...

**Disney Megademo - AAA/Goblin/Pantasy**

The term mega refers to demos, mostly to the quantity of individual parts and less to the class. In this demo apparently, some Russian coders have joined together and everyone has brought their qualities to the screen. At the beginning we see an animation... I guess it's not programmed at all, but the images are called one after the other, which is why they are repeated all the time. In addition, a text in Cyrillic language, which I haven't mastered. This continues in the second part. The third part has a larger font that scrolls across the screen in sine waves in front of an animated background. Already better, but in 2017 nothing special anymore. The fourth part seems a bit like telling a story. The whole thing is accompanied by pictures and a somewhat melancholic sound. Not badly done at all. With a very progressive sound the fifth part continues. In front of the Statue of Liberty several patterns appear in quick succession. At the end there is a last picture with also several patterns, which appear as an effect and disappear. The demo is a bit outdated even on one computer. You already know the effects and neither the sound nor the graphics are real treats. But it's just old-school again with Space key press for the next part. So we already know that... from 1992.

**Ultraviolet - Hooy Program**



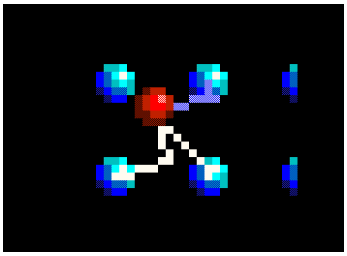

Meanwhile we arrived in March and what is in March? Yes, ok, ZX81 meeting in Mahlerts, but what else? The Forever demo party in Trencin. For Spectrum-Demo-Fans it's the party par excellence,

because it's one of the few where the Spectrum actually plays the most important role. Moreover, it is still relatively central in the heart of Europe, while the others are all in Russia. If we are now already with regularities... who always wins? Yes, ok, the Gemba-Boys, but they didn't compete in 2017 and therefore the chance for Hooy-Program or Gasman. He has already won a cupboard full of T-shirts. His demos don't always knock over because he has effects that push the Spectrum to its limit, but because he does something that others haven't done before. In 2016 he surprised with his karaoke demo and this year... Ultraviolet. When you download, you get three programs. The first is to calibrate the screen. No, of course not, there's just a gag. Surely there was a laugh at the party. Then we start the actual demo, which first of all lives up to its name. At least I think I've never seen these color combinations before. Great color effects with a fast sound. After some effects including Overscan it gets quieter and we see a multicolour-picture show, also with colour mixes that sometimes look very realistic. An absolutely worthy winner of the Forever. The third program in the package seems to be actually the same demo to me, there may be small changes in details, I didn't notice them.

**Bad Apple 2 - Noby + Factor6**

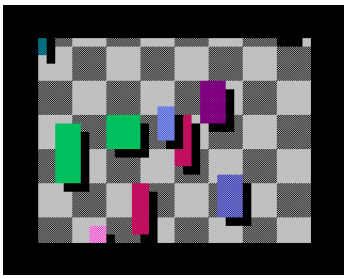
Oh, wow, where do we start here? Best with the Japanese singer Nomico. She covered a former song of an earlier video game and made a song with a video on it. This video with shadow plays somehow made coders all over the world copy a version of this video. So there are versions for Atari VCS, the Gameboy, C-64, NES, Apple II, and in 2016 there was also a version for the Spectrum... well, not really... it was the Pentagon with 512k and Turbo soundcard with two soundchips. Exactly here comes the sensation, that the two of them have implemented the whole thing for a normal 128k Spectrum... ok, not quite normal, that you need a DivIDE. The amount of graphic animations can't be pressed into the 128k memory, but the special thing is a fast load and unpack routine, which pulls the whole thing fast enough from the hard disk/SD card/CF card to display it exactly right. The sound has been implemented in a first-class way. No digital sound, no two sound chips. A normal AY-sound, but very similar to the original and just really well realized. When it comes to a demo that shows what you can do with the Spectrum in combination with a DivIDE, this is certainly a good possibility.

**Big things - Speccy.pl**



The guys from Poland made the second place at Forever. For this purpose, they upgraded, improved and extended the prerelease version Big Things Lite. The effects are really worth seeing, really cleanly programmed and fast. Boredom doesn't come up and the cool sound is well tuned. Basically, you've already seen the effects in a similar form, but this applies to almost all demos. It's a clean demo that would probably have won at any party if it hadn't been for »Ultraviolet«.

**Definately Number One aka DNO - sibCrew**



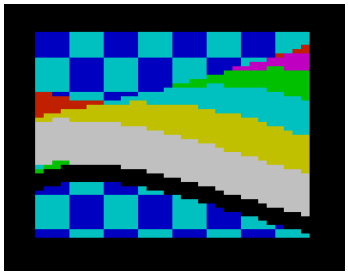
Out of Slovakia in March and into April. Multimatograf was the name of the competition in Russia, which again weighed on us numerous demos. The winner was "de-Marche", but we won't present his Pentagon demo here. But 2nd place is not half bad: First we paint a dark picture of 2019, the year we have now. The Spectrum scene is only Russian... the following sound sounds somehow Russian to me. The demo is altogether however cleanly tuned to this music. The most interesting effect I found were the colored squares shown in the picture, which move over the picture. The demo still offers some graphics but few really strong effects, but it is very stylish. Just lean back and let yourself be sprinkled by the interaction of the graphics and the music.

**Sandstorm - Hooy Program**

Clinging it goes on a time travel... back to the year 2000. We are fully in the techno age and Darude brings the dancers with Sandstorm to ecstasy. If only one could sing along... You can now, because 17 years later the official lyrics for this song are finally released. Hooy-Program in the person of

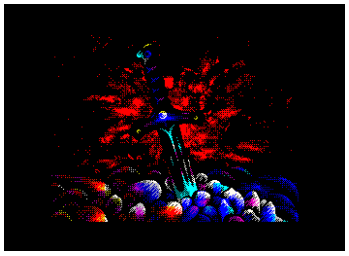
Gasman has taken up this topic, probably because he can already bring in some karaoke experience. Everyone who has some humour, is into techno music and has a sense for innovative ideas should have a look at this work. In any case an excellent implementation of the theme. The question is only who can sing it now... bigger digger bee...

**Very Party Demo - SibCrew**



In Siberia you know how to party... Vodka..., so at least the statement at the beginning. But this demo is probably not the result of a delirium, but cleanly programmed and logically conceived. The demo starts quite simple, without special effects, quite rough graphics and also the sound rather simple. This gets better when a plasma effect appears after one minute and accelerates the music. We continue with a colourful sine wave in front of a chequered background without colour clash. The whole thing is then topped with another plasma effect and an even faster horizontal wave until the demo suddenly ends after an "Amiga" effect. I hear in my mind the applause that this demo received at the DiHalt Party 2017 and with it the competition.

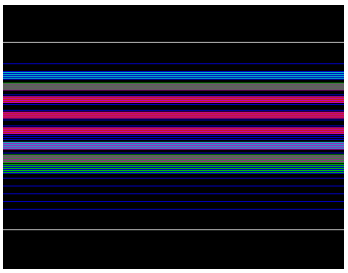
**Ancient Runes - Q-Bone**



Also the 2nd place at the DiHalt party comes up with a plasma effect, but only in monochrome. The sword is also beautifully drawn, also in front of a plasma effect in red. Also here surely a nice demo, although the runic writing is hard to read. The sound is well chosen, but altogether a clear difference to the winning demo, both graphically and sound technically.

**Over Relaxed - sibCrew**

It is summer 2017 and it is the time of Chaos Construction, a big demo party in Russia for all systems and therefore also for the Spectrum. Maybe



the time of the year when the guys from Siberia are really thawing and active, at least they won the Chaos Construction with this demo. As before, the makers play a lot with colors, mix new colors with patterns and combine them with matching music. The demos consist of three parts. In the first one there is not much new compared to their predecessor demos. Rather, it is a new series of well-known effects that they have already shown before. Technically but convincing. This is enhanced in the second part with some overscan effects that are more colorful, faster and more multi-faceted than ever before. In the third part the credits are done, as usual colorful. The demo offers new ideas and is unique in its form and perfectly tuned to the music. Once again the Spectrum is moved to new limits. Applause and place 1.

**Asterisk* - Scriju**

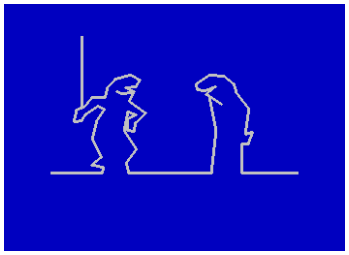
One is used to melancholic black-and-white demos from Skrju. At his comeback (was he gone?) he decided for more color. Different forms are moved, of course calculated in real time (??). The demo is nice to look at, the texts are faded in and out via effects. But it didn't really rip me apart. As always, the whole package of music and picture fits, but nothing new, nothing surprising and nothing that makes me fly from the chair. After all, he got the 2nd place at the Chaos Construction 2017.

**Stawicki vs. Originals - John Dalthon**

Neat idea... This demo is rather a kind of slideshow, the real game screens against which the author (Stawicki) probably created 25 years ago. The whole thing as a kind of competition with music and graphics as well as text insertions. If you haven't seen it for a while and the pictures are really good, I don't al-

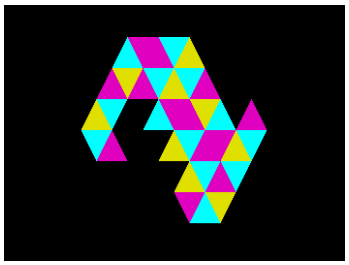
ways like the imitated picture better, sometimes I do. Have a look.

**Partyzanci - The Joker**



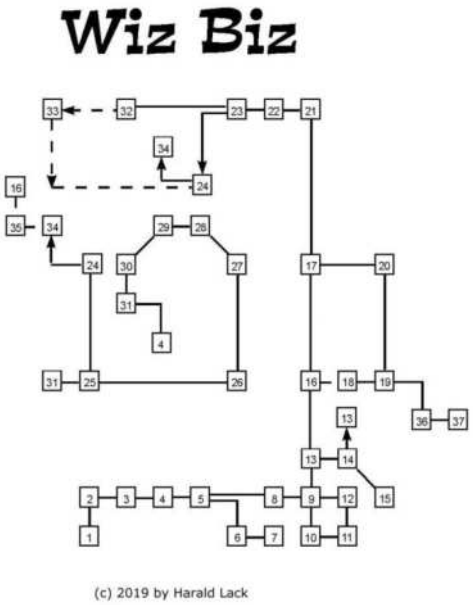
The Polish Spectrum scene has picked up enormous speed in recent years, e.g. CAT-MAN, one of the members of the famous ESI group (Lyra II, Shock) became active again. Now another acquaintance from the 90s joins again, The Joker. His first demo after reappearance can be seen right away. It starts with an animation where a simple hiker happens to do so many things. If you only expect one credits, The Joker will say goodbye with all kinds of effects. He has turned completely to the new style, so not a demo interrupted by several parts, but quasi a demo that runs through like a film in one piece. So... welcome, Joker, in 2017. I'm sure we'll see more of him.

**:3 (tri) - g0blinish**



We started this demo article with g0blinish and so we also end, as promised after 4squares this time with triangles. He makes his promise true and presents triangles in all variations, big, small, with attributes. But he doesn't produce them in Border or Multicolour, which would have torn me off my seat. It remains a good demo with a lot of fast effects, which fit perfectly to the music, which is a bit progressive like last time. In the credits he does another survey: Should it be circles next time? G0blinish made the 2nd place at the Demosplash 2017 with this title. This is all the more remarkable as this party was not a special Spectrum competition, but you had to compete against other old-school systems as well.

## ADDENDUM TO WIZBIZ FROM SUC 223




mea culpa! Here is the missing plan to WizBiz from SUC 223

# BENCHMARK TESTS

### BY JOACHIM GEUPEL

In 2013 I decided to join the ranks of those who deal with the computers of the 1980s. First I looked around my home. There were two Atari ST and a ZX Spectrum +2A. Admittedly the parts were quite dusty. But they still worked.

The next achievement was a perfectly working TI99/4a, which I could buy together with power supply and modulator. The third in the line was a Schneider CPC464 with a lot of programs and an extremely extensive collection of newspaper clippings - a real treasure trove.

The collection now includes more than 40 computers and I'm running out of space. I had to restore some of the computers, but that's another story. In the collection are relatively rare devices like the Oric Atmos, a Laser 210 and a Philips P2000T, the pre-buyer of the MSX computers. Furthermore, there is an 80C535 micro-controller system with which I designed my masterpiece in 1993. At that time it was absolutely state of the art, but in the meantime it's gotten on in years.

At some point, of course, I was also interested in how fast the individual computers were. In the Tlienhard forum in the ZX81 group a program was to be found, which was suitable outstanding to accomplish the mentioned tests. Of course, it is an advantage that the Sin-clair-Basic can be easily transferred into other Basic dialects. However, not all computers offer the possibility to program a time measurement directly in Basic. In the Sinclair

Basic this is possible, even if it is done via the system variables. Other computers don't offer this, or I didn't find out. For this reason I have used another method, which is still reasonably accurate and which I will explain later.

First of all, the question of what a benchmark test is should be answered.

Wikipedia says about this:

Benchmarkings are standardized measurement and evaluation methods with the help of which you can determine the performance of IT systems or system classes and compare them with each other according to certain criteria.

On the one hand, there are benchmark tests for hardware performance. These compare the computer systems on hardware level to each other. In addition, there are benchmark tests that are carried out on computers of the same type and with the same configuration level. They compare programming languages running through an interpreter and the runtime of the compiled results of the program code.

The program listed here was written for Sin-clair ZX computers. The basic of the ZX computers is interpreted, i.e. both the ZX81 and all other computers of the ZX Spectrum series have a basic interpreter that translates the programs line by line and then executes them. I know this fact is well known to all readers.

By translating to other computers in other Basic dialects, the Basic interpreters are compared. So this is a software benchmark. Due to the different hardware, a hardware benchmark takes place at the same time.

However, I actually doubt whether this test can be called a benchmark. Finally, the runtime of a certain program part is measured, which is executed almost identically on all computers.

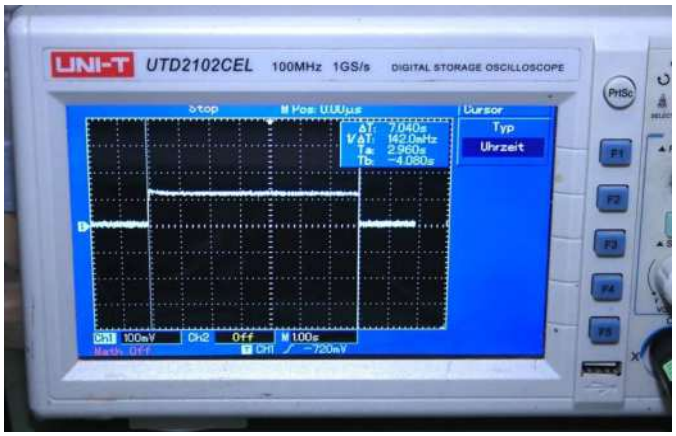
**About the program:**

The program calculates prime numbers from 1 to 1000 and was written by Bernd Bock, posted several years ago in the ZX81 forum on "forum.tlienhard.com". I wrote the screen output that shows that something is happening. Without these you sit in front of the monitor and don't know if anything is still happening or if the computer has already hung up. Also the time measurement comes from me.

At program launch, a field is created with DIM p(1000) and filled with "1". This takes a few seconds, therefore a visible counter runs along.

The main program, in which also the time measurement is started, reports itself with "prime numbers are calculated". If the result of the calculation is not equal to "0", the number is not a prime number, result "0" indicates the prime number. As soon as a prime number has been calculated, the field "1" is changed to "0".

If the end value "1000" is reached, the time measurement stops and the result is displayed, converted into seconds.




Time measurement with solar cell and image on the Digi-Scope

Finally, the prime numbers are listed, whereby each prime number is marked with "1" in the field.

With the ZX Spectrum I used the system variables for time measure. For computers with a timer in the command set, I used it.

For computers without a timer, I had to resort to a hardware solution. In my parts collection of electronic components there is also a solar cell. I used this. Instead of the timer start, I displayed a bright line on a dark screen or simply inverted the entire screen. This line fades in as soon as the calculation starts. When the calculation is finished, the line

fades out again. I mounted the solar cell on the screen and connected it to my digital oscilloscope.

The line on the Digi-Scope jumps up and falls back to the zero line if the line first fades up and then fades down again. The measurement is not really accurate, but it shows a clear trend.

The following table shows the results of the different computers, but does not claim to be complete or correct. After all, there are a lot of different computers, and I've repeated the tests several times and got some differing results.

```
  1 REM Original-Programm from
  2 REM Bernd Bock
  3 REM
 10 BORDER 0: PAPER 0: INK 7:
    BRIGHT 1: CLS
 20 PRINT INVERSE 1;" Sieb des
    Eratosthenes "; INVERSE 0
 30 DIM p(1000)
 40 PRINT AT 2,0;"Feld wird
    initialisiert:"
 50 FOR i=2 TO 1000
 60 LET p(i)=1
 70 PRINT AT 2,25;i
 80 NEXT i
 90 PRINT AT 2,30;"ok"
100 LET p(1)=0
110 PRINT AT 4,5;"Start!"
120 PAUSE 50
130 REM cls
140 PRINT AT 6,0;"Primzahlen
    werden berechnet..."
150 POKE 23672,0: POKE 23673,0
160 LET s=(PEEK 23672+255*PEEK
    23673)/50
170 FOR q=2 TO 32
180 IF p(q)=0 THEN GO TO 220
190 FOR i=q*q TO 1000 STEP q
200 LET p(i)=0
210 NEXT i
220 NEXT q
230 LET t=(PEEK 23672+255*PEEK
    23673)/50
240 PRINT AT 8,5;"Fertig!"
250 PRINT AT 10,0;"Dauer:
    ";t-s;" Sek."
260 PRINT #0;"Weiter mit
    Tastendruck"
270 PAUSE 1000
280 CLS
290 LET c=0
300 FOR i=1 TO 1000
310 IF p(i)=0 THEN GO TO 390
320 IF c<8 THEN GO TO 350
330 PRINT
340 LET c=0
350 LET c=c+1
360 IF i<10 THEN PRINT " ";
370 IF i<100 THEN PRINT " ";
380 PRINT i;" ";
390 NEXT i
```

| Benchmark-Tests Home-Computer | | | |
|---|---|---|---|
| **Hardware** | | | **Zeit** |
| Laser 210 | | | 9,24 sek |
| Atari 600 XL | | | 11,84sek |
| Atari 800XL PAL Turbo Basic | | | 4,02sek |
| Atari 130 XE | | | 11,84sek |
| Oric Atmos | | | 10,08sek |
| ZX 81 | | Slow | 53,6sek |
| | | Fast | 8,28sek |
| AX 81 (ZX-Clone) | Spectrum48 | | 47,8sek |
| | ZX81 | Slow, normal | 64,8sek |
| | | Fast, normal | 19,4sek |
| | | Slow, full speed | 40,2sek |
| | | Fast, full speed | 11,7sek |
| ZX Spectrum 48 | | | 17,6 sek |
| ZX Spectrum +3 | 128-Basic | | 25,14sek |
| | 48-Basic | | 18,9sek |
| ZX Harlequin 48 | | | 17,8 sek |
| ZX Harlequin 128 (mit 27MHz-Quarz) | 128-Basic | | 27,8sek |
| | 48-Basic | | 18,9sek |

| | | | |
|---|---|---|---|
| Philips VG8010 | | | 7,04sek |
| Philips VG8020 | | | 7,22sek |
| C64II | | | 8,53sek |
| C128D | C64-Mode | | 8,13sek |
| | C128-Mode | | 10,98sek |
| Acorn Electron | | | 9,87sek |
| Schneider CPC6128 | | | 4,527sek |
| 80C535 Entwicklungssystem(*) | | | 4,13sek |
| **Zum Vergleich 16-Bit Atari ST** | | | |
| Atari Mega4 ST | GFA-Basic 3.0 | Interpreter | 0,17sek |
| | | Compiler | 0,085sek |
| Atari Mega4 STE | GFA-Basic 3.0 | Interpreter | 0,17sek |
| | | Compiler | 0,08sek |
| **Außer Konkurrenz** | | | |
| PC, QuadCore,3.3GHz | GFA-Basic 32 | | 21,51µsek |

## THE STRANGE EXPERIMENTS OF PROFESSOR ST. CLAIRE

# PROFESSOR DR. DR. ST. CLAIRE AND THE SPLITTING OF THE BIT

### PART I

BY JOACHIM GEUPEL

Via various dubious channels, our Editor has recently received a couple of documents that seem to disclose the research and experiments of the ingenious and rather unworldly scientist Prof. Dr. phil. Dr. temp. O. Je. St. Claire. After some thorough inspection, verification, even more verification, and consultancy of all other kinds of related documentation, the editors of the SUC session decided during several thoroughly exhausting powwows (that involved the complete annihilation of the alcohol stocks of the respective host) to make the documents in question accessible to the general public in general and the SUC readers in particular.

Upfront warning: Readers suffering from a - possibly congenital - sensitive state of mind or potential heart conditions are strongly discouraged from accessing these reports. They could suffer permanent damage in the process. The editorial staff of the SUC session reject any liability!

Furthermore, all remaining readers are obliged to maintain absolute confidentiality! This report and all follow-ups are for internal use only!

In case of non-compliance, the person in concern will be sentenced to lifelong Commodore 64 handling without any chance of remission!

Since we succeeded in decrypting the data with the help of a Sinclair Spectrum 48k as the only possible and available high-performance computer, nothing should stand in the way of publication.

Here some introductory information:

Who is Prof. Dr. phil. Dr. temp. O. St. Claire?

Prof. Dr. phil. Dr. temp. O. Je. St. Claire, for simplicity's sake referred to only as "Prof. Dr. St. Claire", "The Professor" or also "Prof", used to be a retired professor at a close-by elite university, which nobody knows anyway and of which nobody knows where it actually lies. He had taught unspecified courses at this institute of higher education until he was dismissed for spending the entire research budget of 3.20€ on the development of the Sinclair Spectrum 48+ (he had overlooked the fact that the thing in question had long since been invented).

Upon leaving the university, he of course took along all his research results and, beyond that least, his faithfully devoted factotum, Henry S. Lowrenz.

Prof. Dr. St. Claire is of haggard form, an ample 190 cm figure, and pronounces a bald head bordered with long white hair. In order to keep his brain - constantly running under full load - at operating temperature, he either wears a British melon or a top-hat. The latter is equipped with a bewildering construction of cooling fins to cool the precious contents it is intended to protect. During mild to moderate mental activity of the same, the cooling fins of the top-hat tend to glow in a soft red. For particularly intensive intellectual activities which require the entire 102% of his mental capacity, he is also in possession of a second top-hat tat one's cooling fins are circulated with liquid helium; otherwise the heat generated would not dissipate fast enough.

Who is Henry S. Lowrenz, practical universal genius and factotum.

Henry S. Lowrenz, factotum of Prof. Dr. Dr. O. Je. St. Claire by trade, takes care of anything that could potentially harm or interrupt the professor's thought processes.
He runs the household, the professor's country estate and otherwise takes care of all tasks that might seem important in any way. He also acts as living diary, an external memory extension to the Professor, and, should the need arise, as a crane for any heavy lifting.
Henry S. Lowrenz is constantly trying to detain Prof. Dr. St. Claire from wasting his dynasty's sparse financial legacy. Yet he rarely succeeds in doing so, which does not seem to matter much, as new funds seem to be constantly dripping in from somewhere.
In contrast to the professor, Henry S. Lowrenz is of rather small stature. He is only approx. 160 cm tall but bears gobsmackingly impressing musculature - a fact he personally regards as rather embarrassing. He tends to comment this with: "Well, I just can't help it! «.
Henry is the one who always ensures that the professor keeps his thoughts at least approximately connected to reality and at least somewhat down-to-earth. He is constantly concerned about the professor's well-being and is also permanently worrying about the potential survival of his sometimes-daring experiments.
Nobody knows what the "S." in his name is supposed to stand for, by the way. Henry hasn't told anyone yet and doesn't seem to be willing to tell anyone in future.
The following report, like all other reports, has never been published and is going to reveal one of the greatest secrets of our planet.

* * *

The professor had been dismissed a long time ago.
After being accused of the recklessly wasting the university's research budget, he collected both his melon and his cooling top-hat, and, half voluntarily, half involuntarily, put on the former and grabbed the latter. He had been advised to leave the university on the grounds that such an irresponsible waste of research funds was unacceptable. His offer to pay back the 3.20€ from his own pocket had been rejected with great indignation. A warning example had to be made in order to prohibit similar incidents in the future.
So, the Professor seized melon and top-hat and rushed out of the university, followed closely by his friend and factotum who didn't see the expulsion a good reason to let down his friend and mentor.

* * *

"My dear Henry! " the professor announced to his factotum. "Now we finally have time to take care of our own projects! «.
"Which would be? "Henry asked.
"We will develop the Spectrum 128! It will have cooling fins on the right side to dissipate excess heat! Furthermore, it should have 128 Kbytes of memory, which can also be used as RAM disk. You will see, the punters will beg to have one and we will have the world at our feet! We will become incredibly rich! «
The professor looked down on his friend and servant and laughed triumphantly.
Henry, for his part, looked up at his boss from below.
A few minutes passed in mutual silence.
"Chief? «
"Yes?"
"The Spectrum 128. It already exists «
"What?"
"It's called a toastrack. «
"Really?"
"Yes!"
"Why?"
"The Spectrum 128, also known as the Toastrack for of its cooling fins, was born from the depths of the genius of Sir Clive Sinclair. «
"Oh?! Really? I don't know. «
"Yes!"
The professor was a little irritated. Two hundredths of a second of deep silence followed, then...
"We'll have to think of something else. «
A special characteristic of the professor was to never lose courage and always think positively in every situation looking forward to the brightest future. This was also the case this time.
He left the university in a cheerful mood, lightheartedly swung his walking stick, pleased about everything that might be coming.

* * *

When they arrived at his country estate, the professor first went to his laboratory (which was equipped with the latest and greatest Sinclair ZX Spectrum high-performance computers). He pulled a cup of tea from the tea machine he had invented just recently, but tossed it immediately because the tea machine still had some development flaws and instead lit a spliff. After a few puffs, His thoughts immediately began to wander off into the next future. He automatically changed his headgear. He pulled the melon off his head and put on the cooling top-hat, whose cooling fins began to glow immediately.
Meanwhile, Henry warded the environment with watchful and suspicious glances. No one, neither human nor animal, neither microbe nor alien should disturb or interrupt the professor's thought process.
After exactly 33 minutes and 22.4 seconds of intensive

thinking, the gentle glow of the top hat's cooling fins faded. cooling down with a quiet crack.
"Eureka!"
"I am curious? «
"We're going to do something no one's ever tried before. This is as important as the findings of the general theory of relativity and the discovery of atomic nuclei! If we succeed, we will revolutionize natural science! Physics and everything must be reconsidered! Let's start immediately! Let's go! «
"Chief! «
"What is it?!! «
Henry looked at his boss a little clueless.
"What are we going to do? «
"Didn't I say that? «
"Nope!"
"We split the bit!"

* * *

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Splitting of the bit - day 1:*
The first preparations for the splitting of the bit were carried out.
In order to find a suitable bit that had the necessary properties, various bits were examined. First the beer type "Bit" was examined. However, this turned out to be completely unsuitable. The "bit" does not have any of the required properties such as "external integrity", "straight edges" and "uniform symmetry in all six existing dimensions". However, it turned out that the same "bit" was well tempered and was stored in a suitable drinking vessel named "Pilsner tulip" tastes great.
Henry and I spent a pleasant evening with a detailed destructive investigation of the remaining 19 glass containers and the liquid therein.

*Recording Henry S. Lowrenz - Splitting of the bit - day 1:*
I bought a case of beer.

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Splitting of the bit - day 2:*
Woke up this morning, didn't feel well. Headache. I'm sick.
Any thought of food seems unbearable.
No further examinations possible today.

*Record Henry S. Lowrenz - Cleavage of the bit - day 2:*
Oh man, I have a hangover! I'm simply not used to drinking. One of the ten beers must have been bad. I guess that's what it is!
Thank God there are no further experiments today.

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Cleavage of the bit - day 3:*
After the inexplicable physical discomfort has subsided, further investigations are carried out. To get the minimum number of bits needed, I decided to buy Apple, Commodore and Atari computers. Some of these computers will then be shredded. The other part we will leave as they are. Afterwards both the acquired parts and the intact devices will be exposed to a vacuum. The substances obtained by vacuum distillation will be filtered and examined for useful bits.
However, the vacuum seems to cause problems. All existing vacuum pumps do not achieve the necessary levels of evacuation. We will therefore pack all the parts into our spaceship, venture into space between Mars and Jupiter and carry out vacuum distillation there in the emptiness of space.

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Bit cleavage - Day 3, afternoon:*
Henry reminded me that, apparently, we don't have a spaceship. So, I will have to build that first.
The control computers are available, as well as the necessary on-board computers. The Sinclair Spectrum is the perfect solution.

*Recording Henry S. Lowrenz - Cleavage of the bit - day 2:*
I bought all available Commodore, Apple and Atari computers on eBay and picked them up right away. I had to chop up a part of it.
First, I jumped on them. But that didn't do much good. The parts are solid.
Went for the 15 kg sledgehammer. That did the trick.
The professor expects the crushed computers to give him easier access to the bits he is looking for. I am curious!
The first experiments to distil the parts in a vacuum failed. Our vacuum pumps are not good enough. Not even the one in the de-soldering station.
Maybe he should try it with the vacuum in his head!
Har Har! Stupid joke.
The Prof then wanted to load the whole stuff into his spaceship and launch it into space. There the vacuum is supposedly high enough.
I had to remind him that we don't have a spaceship.
Now he's inventing one.
I bought a new case of beer. The old one was empty.

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Bit cleavage - day 17:*
The spaceship is ready. And the new helium-cooled cooling cylinder also worked.
The seven ZX Spectrum 48 are installed. The 8255 and Z80 PIO boards are plugged on and connected to the electronics in the spaceship. We're ready to go. The ZX Spectrum are networked via Interface 1 and various cables.
Launch is scheduled for tomorrow morning, 7:00 am.

* * *

Protocol of the space flight for the extraction of the bits:

The professor leans forward in his contour chair, presses a button on the control panel and speaks into the microphone of the on-board intercom:

"Chief navigator and commander to crew! Everyone on board? «

The answer's coming right up:

"Aye! Captain! «

Commander's request again:

"Please report with name and rank!"

Answer of the whole team is on schedule:

"Henry! Factotum! «

The professor looks questioningly at the display on the control panel:

"Henry! Where are you? «

The entire team responds immediately:

"Chief! I'm sitting next to you! «

The commander turns his head and apparently has a reassuring glance at Henry.

Then:

"Ok! Check! Computer ready? «

The part-time computer specialist Henry answers:

"Computers are running! Microdrive is online! 64-character set loaded! Program started! «

The commander takes his responsibility very seriously and calls for connection with the navigation:

"Navigation and positioning! Report! «

Part-time navigator and tracking specialist Henry reporting in immediately:

"Navigation online! Positioning online! Navigation ZX Spectrum 48 running! «

"Commander to Machine! Prepare for takeoff! Countdown from 10 to 0! «

The part-time chief engineer Henry answers:

"Machine to commander! Machines are ready to go! Countdown running! «

From the loudspeaker of the Cheetah Sweet Talker the robotic voice sounds, announcing decreasing numbers.

Then: The spaceship takes off with heavily swirling smoke and infernal noise. The acceleration pushes the entire crew into their pressure chairs. With fabulous thrust, controlled by the seven networked ZX Spectrum computers, the "Sir Clive", the spacecraft of the ingenious professor, launches into the infinity of space.

*Recording Prof. Dr. Dr. O. Je. St. Claire*

*Bit cleavage - day 27:*

After ten days of travelling through the solar system we arrived at Jupiter.

The place is cluttered with space debris. The Amis with their Jupiter probes! Really! They could have cleaned up a bit.

The preparation for vacuum distillation of the computers starts. Success seems to be inevitable.

*Bit cleavage - day 27:*

I am sick!

*Recording Prof. Dr. Dr. O. Je. St. Claire*

*Bit cleavage - day 30:*

The vacuum distillation of the computers has succeeded. The glass flasks of the bit filter system contain several hundred bits of the corresponding computers. We will return to earth to sort the bits and examine their quality.

Recording Henry S. Lowrenz

Bit cleavage - day 30:

I'm still sick!

*Recording Recording Prof. Dr. Dr. O. Je. St. Claire*

*Bit cleavage - day 40:*

The spaceship "Sir Clive" has returned to Earth. Now the evaluation of the bits, which are still in the glass flask and have not evaporated, can begin.

Let's get to work and write history!

*Henry S. Lowrenz - Bit cleavage - day 40:*

Boah Ey! I'm glad we're back!

*Recording Prof. Dr. Dr. O. Je. St. Claire*

*Bit cleavage - day 41:*

During our stay in space several kilos of bits were distilled. It turned out that it makes no difference in what state the computers are in during the distillation process. Sufficient bits have been distilled out.

On closer inspection, however, there appear to be some problems with the bits:

The bits of the Apple computers are too small. Although they shine beautifully, they are not usable according to today's state of the art. I've asked Henry to store them.

The bits of the Atari computers have the right size. On closer examination, however, it turned out their energy content is too low. They also have the ability to evaporate. Henry has submerged the bits that have not yet evaporated, in the liquid helium, which is actually intended for cooling my cooling cylinder.

The Commodore bits are a single catastrophe: they are so worn out on all sides by too long use that they no longer shine but just vegetate bluntly. Their surface is very roughened, they also stick to each other and tend to form bytes. The bits of the Commodore 64 turned out to be especially bad. They are heavily worn on all sides and jam on their way through the tracks. This creates a bit jam which explains the low processing speed of the VC 1541 disk drive.

In addition, some of the bits have clumped together to form a kilobyte and can no longer be separated - absolutely unsuitable.

I decided to sacrifice a Sinclair ZX Spectrum 48 to extract the bits it contains. Surprisingly, the vacuum generated by the de-soldering station is sufficient.
So: Get to work! It's time to revolutionize science!

*Recording Henry S. Lowrenz - Bit splitting - day 41:*

The boss has gone mad!
He breaks a ZX Spectrum!
Supplement:
He hasn't gone crazy. He managed to extract 255 intact bits.
And we didn't even have to start into space again.
But that could have occurred to him earlier. I was sick all the time when we were out there. Could also have been on the McDonalds food on board...

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Bit splitting - day 42:*

The bits of the ZX Spectrum are of the highest quality. Their six dimensions are beautifully smooth, the surface shines as expected, they have the proper size. And what is even more important, the energy content is exorbitant.
In the words of my great idol Archimedes of Syracuse: Eureka!
To celebrate the day, I will treat myself to a Big Mac.

*Recording Prof. Dr. Dr. O. Je. St. Claire*
*Splitting the bit - day 42, entry 2:*

I am sick!

R*ecording Prof. Dr. Dr. O. Je. St. Claire*
*Splitting the bit - day 43:*

After my inexplicable physical discomfort has passed - I'm puzzled as to where it came from - I'll take a closer look at the bits of the ZX Spectrum 48.
In the run-up, certain problems are emerging: Since the energy content of the bits is so high, there is a danger that too much energy will be released during splitting.
I have to think about it...

* * *

Professor St. Clair spent the following two weeks with intensive reflection. The waste heat from the cooling cylinder, which rested on his head as is usual in such situations, was fed by Henry into the central heating system of the professor's country estate. The heating costs saved were used to benefit the experiments.
On the 15th day the professor finally turned to his factotum:
"Henry! We'll prevent a catastrophe by traveling as far back as possible to the past with our time machine. A time in which there is no danger that humanity will be harmed by the daring experiment! «
Henry sat in one of the armchairs that stood around in the professor's laboratory, let one of his legs dangle casually over the armrest and looked up from there to his boss. He filed his fingernails with one of the Commodore C64 bits:
"Chief! The plan is great! But we have a problem!
"That would be there? «
"We don't have a time machine! You haven't invented one yet! «
"Who?"
"You! «
"Me?"
"Yes!"
"I'm going to have to invent a time machine!"
Speaking, he exchanged the melon for the top hat cooled with liquid helium and started with intensive contemplation.
While Henry made sure that the hot helium was permanently replaced by new liquid helium, Professor St. Claire sat motionless in his laboratory thinking.
After another two weeks of thought work and several tons of evaporated helium, he suddenly jumped up, threw the cooling top hat into the corner and began to assemble the time machine in feverish activity. The necessary flux compensator was replaced by a ZX Spectrum with a Multiface One, and elements that had been installed in the spaceship were scavenged and wet into the time machine.

* * *

It should be noted here that the professor actually was a genius. He didn't forget minor luxuries like minibar or toilets. The built-in whirlpool was great!
In addition, some mobility in three dimensions was planned in, which led to the fact that the time machine was airworthy within limits. Besides the apparatus that made a journey through time possible, there was still place for the devices that accomplished the splitting of the bit experiment. There were several heavy hammers and a large percussion drill on storage. A large special vice was installed to ensure the fixed positioning of the bits to be split. A chisel developed by the professor (the "PEEK chisel") as well as different scalpels ("OUT blade", "RANDOMIZE blade" and "USR scalpel") were part of the toolbox to achieve the actual splitting. The energy released should be measured with a "POKE meter". The scale of the "POKE meter" was open to the top and divided into "RND". The splitting was intended to be performed using a remote-controlled model car with an attached robot arm. Everything would be monitored from a safe distance by video recording.
So, all set.?

End Part 1

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